

Do Grandmothers Matter? Grandparental Effects on Occupational Status during the 19th and 20th Centuries in France

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ABSTRACT

The impact of grandmothers' characteristics on the transmission of family resources to grandchildren is often neglected, especially in the historical context. This study asks what the effects of grandmothers' occupational status was on the occupational status of their grandsons' and granddaughters' in the 19th and 20th centuries in France, and how it compared to that of grandfathers' status. We also study how these effects changed over two centuries. Using TRA data, we analyze the status of 2,000 granddaughters and 4,130 grandsons and find that grandfathers' occupational status mattered for both grandsons' and granddaughters' status while grandmothers' status did not. Over time, the positive influence of grandfathers' status on grandchildren's status remained stable.

Keywords: Multigenerational social mobility, Occupational status attainment, Grandparents, Gender, Historical database

1. Introduction

Social status attainment refers to how individuals obtain their positions in the social hierarchies of wealth, power, and prestige (Haller & Portes, 1973), which has typically been studied regarding income, occupation, and education. Occupational status attainment is not only formed by individuals themselves but also influenced by family background. Beginning with Blau and Duncan (1967), researchers have focused on how fathers' occupational status directly or indirectly (e.g., via education) affects sons' occupational status. Subsequently, the influence of mothers has also received attention (Beller, 2009; Rosenfeld, 1978; Kong et al., 2020), and thus gender perspectives have been incorporated into the study of occupational status attainment between two generations. With the consensus of a positive relationship between parents' and children's occupational status in modern society, scholars look beyond the parents and extend the research questions to three or more generations (Knigge, 2016; Olivetti et al., 2018). Studying the grandparental effects on occupational status attainment may be important for understanding how social inequalities are transmitted and reproduced across generations and how they can be changed or reduced.

Whether grandparents' occupational status has direct effects on grandchildren's occupational status is still unclear. Most scholars used contemporary survey data and mainly included samples from the 1940s onwards to examine grandparental effects on occupational status attainment. Some of these studies found that grandparents have no direct effect on grandchildren's occupational status attainment once parents' characteristics are taken into account (Erola & Moisisio, 2007; Warren & Hauser, 1997), while others supported the opposite view and indeed found grandparents' occupational status is directly related with their grandchildren's occupational status (Chan & Boliver, 2013; Hertel & Groh-Samberg, 2014).

With the emergence of new methods for combining and constructing historical data (e.g., population registers and genealogical data), historical data spanning longer periods is available to study the grandparental effects on occupational status attainment and even the historical trends of the grandparental effects. Using historical register data, a few scholars found evidence of the grandparental effects in occupational status attainment. Knigge (2016) used Dutch data covering the period from 1812 to 1922 and found that the grandfathers' status influences the status of grandsons after fathers and uncles are taken into account, and the influence of the grandfathers and great-grandfathers remains stable over time. Using data in

Sweden from 1815 until 2011, Dribe and Helgertz (2016) demonstrated a positive association between grandfathers' occupational status and the outcome of grandsons, and the relationship remains stable over time and is stronger for paternal grandfathers than for maternal. Long and Ferrie (2018) used historical censuses to link three generations and found that, after controlling for fathers' occupation, grandfathers' occupation status positively influence the occupation status of the grandsons in Britain and the U.S. between 1850 and 1910, while they were unable to estimate the historical trends of grandparental effects.

This research aims to examine the grandparental direct effects on status attainment and capture long-term trends in these effects, promoting our understanding of inequality persistence across three generations. Given the limitations of previous studies, this research can provide three main contributions to the current literature. First, by estimating the gender-specific effect in grandparental effects, this study makes grandmothers and granddaughters, typically overlooked in past research, "visible". To my knowledge, historical studies have focused on the impacts of grandfathers on grandsons, while neither the impacts of grandmothers on their grandchildren nor the impacts of grandfathers on granddaughters have been studied. Many of the general hypotheses have not been tested for women in the past, partly due to limited information on women's occupations in historical data (Kong et al., 2020; van Leeuwen & Zijdemann, 2014). However, some women did work during the 19th and 20th centuries. For grandmothers who had jobs, their occupational status could influence the occupational status of their grandchildren, for instance, through the transmission of occupational knowledge and skills, which could influence their grandchildren's career choices. If the influence of grandmothers does exist, then previous research on status attainment may have overestimated the influence of grandfathers and parents. For grandfathers who had jobs, their occupational status could influence the occupational status of not only their grandsons but also their granddaughters. Therefore, we should include both grandmothers and granddaughters in the analysis when the data allows it.

Secondly, this research will examine the historical trends of grandparental effects, which have been seldom studied before, partly because most datasets cover a short time period. However, a historical dataset in France spanning the 19th and 20th centuries will be used in this study, allowing the exploration of historical trends. During these two centuries, French society has witnessed some important changes, which may cause changes in the grandparental effects in status attainment. Economically, industrialization and the technological revolution both significantly changed the occupational structure and provided more new career choices, first for workers in the factory and service sectors, then for the jobs in modern telecommunication,

transportation and information (Diebolt et al., 2019), which may have led to a weakened grandparental influence since the knowledge and skills that grandparents can pass on are less applicable to these new careers. The access for single women (usually poorly educated) to salaried jobs increased during the 19th century, and the access for married women, particularly those with young children, to the labour force, also increased significantly during the second half of the 19th century; in the second half of the 20th century, the level of female labour force participation in France continually grew, and women started to work across virtually all occupational sectors (Zijdeman et al., 2014). Culturally, early 19th-century schools were strictly divided by both sex and class: elementary education was directed toward the poor and girls, whereas secondary education was mainly for wealthy boys (Rogers, 2020). Due to the compulsory elementary education for both sexes mandated by the French governments since the 1880s, literacy and enrolment rates in primary and secondary schools increased dramatically for both boys and girls (Diebolt et al., 2019). In the 20th century, the appearance of comprehensive secondary schools after World War II and the generalization of coeducation led to the massive presence of girls in secondary and higher education (Rogers, 2020). Both increased female labor force participation and educational attainment can contribute to reducing gender segregation in the labor market, and we can expect that cross-gender grandparental effects on status attainment will be stronger over time.

Thirdly, by taking the occupational status of both fathers and mothers into account, this study is able to control for the indirect transmissions of resources from grandparents to parents and to capture the direct effects of grandparents' occupational status on grandchildren's occupational status. Previous historical studies only controlled for fathers' occupational status when considering the effects from grandparents to grandchildren through parents. However, only measuring parental status by fathers' status is an inadequate measurement of family background, which can underestimate the effects of parents and distort conclusions about status attainment and social mobility (Beller, 2009).

This study raises the following questions: First, during the 19th and 20th centuries in France, to what extent did the occupational status of grandmothers and grandfathers affect that of their granddaughters and grandsons? Second, how did these gender-specific effects change during the 19th and 20th centuries? Studies on three generations and historical trends place greater demands on the data, especially with regard to the information continuity of family descendants. To satisfy such requirements, this study will use large-scale historical data, namely TRA, which includes a sample of 3,000 French couples married between 1803 and

1832 and all descendants of them who have been living in France during the 19th and 20th centuries (Bourdieu et al., 2014). Since not only persons with “TRA” name but also spouses of them are included in the data, allowing us to examine the possible influence of grandfathers and grandmothers and also control for the influence of both fathers and mothers. Moreover, as a national representative dataset with extensive scope both in terms of geography and the number of observations (van Leeuwen, Maas, Rébaudo, & Pélissier, 2016), TRA provides a great opportunity to understand the overall mobility of French society.

2. Theoretical background and hypotheses

2.1. Grandparents’ influence on occupational status attainment

Grandparents can influence their grandchildren’s social status by transferring various resources, with and without direct contact (Knigge, 2016; Mare, 2011). Influence with direct contact involves the transfer of resources through socialization and training (Bengtson, 2001). Grandparents can be one of the primary socialization agents for young children. Through dialogue and shared activities, grandparents transmit to grandchildren their values, experiences, cognitive patterns, and skills that benefit grandchildren’s integration into society (Goodsell et al., 2011). When it comes to occupation, grandchildren might learn occupation-related values, knowledge, and skills from their grandparents in everyday life. Grandchildren’s ideas about occupation choices could be influenced by grandparents, especially if grandchildren are frequently exposed to the specific occupational experiences, knowledge, and environments their grandparents are familiar with. Besides, the daily practice of working is a kind of training in which grandchildren can learn and deepen their relevant occupational knowledge and skills. This holds especially true in agriculture and artisan production in the pre-industrial period and early industrialized period, where children usually learn the necessary skills from their parents and grandparents during the activities such as growing crops, raising animals, and crafting with grandparents (Volti, 2011).

Influence without direct contact involves the transfer of durable resources, such as financial assets and physical possessions (e.g., land). Grandparents with higher occupational status usually own more financial assets and physical possessions. Because of the stability of financial assets and physical possessions, even if the original holder has passed away, the third generation can still benefit from those durable resources (Hansen & Wiborg, 2019; Knigge, 2016; Mare, 2011). Land hesitance is a typical way of transferring durable resources that may influence individuals’ occupation choices, especially in the pre-industrial and early industrialized period. For instance, a farmer who owns a lot of land can bequeath his land to his

grandchildren, and the inheritance of land may help grandchildren become farmers. The transfer of financial assets, such as giving money, allows grandchildren to increase their investment in education and acquire new professional skills and knowledge to meet the new demands placed on the workforce by industrialization.

Previous studies testing the grandparental effects on occupational status attainment in a historical context remain very limited, and a few studies indeed found grandfathers' positive influence on grandchildren's occupational status attainment after controlling the fathers' occupational status (Dribe & Helgertz, 2016; Knigge, 2016; Long & Ferrie, 2018). Either due to the lack of information on women in the data or the neglect of the role that grandmothers may play in the status attainment process, no historical studies have tested whether grandmothers' occupational status affects grandchildren. However, some women did work in France in the 19th and 20th centuries. For instance, many women were engaged in a wide range of work on a farm, and some women worked in the textile industry (Zijdeman et al., 2014). Besides, some women had jobs in the service sector, such as salespersons or administrative roles in telegraph offices (Clark, 2000; Zijdeman et al., 2014). One-third of all young French women may have served as domestic servants before their marriages in the 19th century (McBride, 1974). These working women can own occupation-related knowledge and skills that can be transferred to their grandchildren, and thus help their grandchildren to obtain relevant occupations. Therefore, this study expects positive effects of both grandfathers' and grandmothers' occupational status on both grandsons' and granddaughters' occupational status:

H1a. The occupational status of grandparents positively influenced the occupational status of grandchildren.

However, the presumed influences with direct contact are based on the premise that grandparents and grandchildren cohabit or live nearby (Knigge, 2016; Lehti et al., 2019). Grandparents who live far away often can not interact with their grandchildren verbally and behaviorally, and their values, knowledge, and skills are also often not available for transmission to their grandchildren. Besides, influences with direct contact mainly apply to grandparents who live longer and whose lives overlap longer with those of their grandchildren because direct contact is, of course, impossible for grandparents who are not alive and less meaningful for grandparents who died when their grandchildren were infants and toddlers. Previous study has found that the grandfathers' effect becomes smaller with decreasing shared lifetimes and increasing geographical distance (Knigge, 2016). Therefore, this study expects that both the overlapping lifetime and living distance between grandparents and grandchildren can shape the positive influence of grandparents' status on grandchildren's status:

H1b. The positive influence of grandparents' occupational status on grandchildren's occupational status was stronger when grandparents' and grandchildren's lives overlapped more.

H1c. The positive influence of grandparents' occupational status on grandchildren's occupational status was stronger when grandparents and grandchildren lived closer.

2.2. Gender-specific variances in grandparents' influence

During the socialization process, children tend to identify most with same-sex parents or grandparents and imitate their behaviour, and these behaviours will be further endorsed and reinforced by family members (Acock & Yang, 1984; Boyd, 1989). The gender-specific identification and imitation lead to grandchildren's gender-specific learning of occupational-related values, knowledge, and skills from their grandparents.

Traditional gender norms and gender segregation in the labour market can make it more profitable for grandchildren to learn from their same-sex grandparents. Traditional gender norms of the male as the breadwinner and the female as the homemaker became mainstream only by the mid-19th century. Prior to the 19th century, many partners shared in productive work and domestic work; despite a clearly gendered division of labour, female labour was similarly of vital importance to the family economy (Janssens, 1997). In rural societies, women were also engaged in heavy agricultural physical work in the fields, especially during harvests; in urban societies, women may work as cleaners, washers and small retail sellers. However, during industrialization, many women withdrew from the labour market and lost their important economic role. As male industrial wages rose, many women did not need to work (Vanhaute, 2002); besides, when women are poorly educated their only wage labor outside the home and family farm is in manual work, against which a strong social stigma exists, which also encourage women to leave the labour market (Goldin, 1995, 2021). Seccombe (1995) argued that the form of family organization in which men go out to earn the family's primary income while women stay at home to care for the family should be regarded both as a recent innovation and as historically exceptional. This exceptional family form emerged gradually in the nineteenth century among working-class families and reached its heyday in the 1950s (Goldin, 2013; Seccombe, 1995).

The traditional gender norms are accompanied by gender segregation in the labor market, which was pronounced in European countries in both the agricultural and industrial sectors in the 19th century and early 20th centuries. The majority of women in the labour market worked in female-typed jobs, such as domestic service, child care, and cloth production, while men did male-typed jobs, such as ploughing, cultivating the

fields and doing industrial jobs (Burnette, 2008; Kong et al., 2020). In other words, if the grandfathers and grandmothers were both on the labour market, they were likely in different occupations and thus had different occupational knowledge and skills. For instance, grandmothers are primarily engaged in service, farming, or textiles; granddaughters are more likely to recognize their future jobs as salespersons, helping on the farm, or workers in small textile workshops and learn relevant skills from their grandmothers. Grandsons are less likely to identify with and learn from their grandmothers but are more likely to learn from their grandfathers, who, for example, worked in mining, metalworking, carpentry, and blacksmithing.

Traditional gender norms and gender segregation in the labour market not only strengthen grandchildren's gender-specific identification and imitation, but also shape grandparents' different ways of nurturing their grandchildren. Grandfathers and grandmothers tend to treat grandsons and granddaughters differently at an early stage in their life course (Maynes, 1995), prompting girls to stay in traditionally female jobs and boys in traditionally male jobs when they enter the labour force. For instance, grandsons are usually expected to earn money for the family, and grandparents will make related investments in their grandsons. It is often grandfathers rather than grandmothers who take on the role of teaching their grandsons experience and skills, as grandfathers have work experience in the relevant fields. Granddaughters may be taught by grandmothers to do household chores, care tasks, and make handcrafts (Zijdeman et al., 2014). Some of the girls will become homemakers after marriage, but some of them will enter the labour market and work in child care and cloth production.

Therefore, this study expects that grandchildren may be more inclined towards their same-sex grandparents regarding career choices. Grandparents' investments in their different-sex grandchildren are relatively limited because they do not have suitable experience and skills. There have been no historical studies that examine the gender-specific variance of grandparental effects with regard to occupational status attainment. Some contemporary research has shown the grandmothers' influence, specifically that paternal grandmothers' social class has small direct effects on grandchildren's class aspirations (Moulton et al., 2017), grandmothers' education can influence grandchildren's educational outcomes (Song & Mare, 2017), and grandfathers' educational attainment is more strongly associated with grandchildren's education than is grandmothers' education (Li, 2023). To explore whether grandparents have gender-specific influences on their grandchildren during the occupational status attainment process, this research aims to test the following hypotheses:

H2a. Granddaughters' occupational status was more positively influenced by grandmothers' than by grandfathers' occupational status.

H2b. Grandsons' occupational status was more positively influenced by grandfathers' than by grandmothers' occupational status.

2.3. Historical trends of the grandparents' influence on occupational status attainment

Life expectancy in France has greatly changed over the past two centuries. Life expectancy in France was below 30 in the late 1700s (INED , 2020). However, with the rapid advancement of medical technology and the improvement of sanitary measures and conditions, life expectancy has increased rapidly since the early 19th century and was 79,2 years old for men and 85,3 years old for women in 2020 in France (INED, 2020; Roser, 2020). Even though the large reduction in child mortality has played an essential role in the increase of life expectancy, life expectancy has actually increased at all ages (Dattani et al., 2023). The life expectancy for 15-year-olds was 58 years in 1816 but increased to 83 years in 2021 in France (Dattani et al., 2023), which means that potential grandparents live longer and share a longer lifetime with their grandchildren. Thus, grandparents may play a more important role in their grandchildren's lives because they can sustain relationships with grandchildren throughout childhood and into young adulthood (Dunifon, 2013).

H3a. During the 19th and 20th centuries in France, the effects of grandparents' occupational status on that of their grandchildren became stronger because the lives of grandparents and grandchildren overlapped more.

During the 19th and 20th centuries in Europe, industrialization accompanied dramatic urbanization. The urbanization rate in Europe was stable (10%) until 1800 and increased to 40% in 1910 (Jedwab et al., 2017). Migration is becoming more common in the process of urbanization, where people may move to new places for work. For instance, during the 19th century, annual labour migration destined for Paris is thought to have increased about 14 times (Moch, 2003). Moreover, the journey distance of migration has become appreciably longer (Moch, 2003). One of the primary reasons for this is the rapid development of infrastructure, which has led to an exponential increase in the number of transport routes, especially rail and

waterway transport routes. Hence, the distance between grandparents and their grandchildren could be larger, which would cause weaker grandparental effects.

H3b. During the 19th and 20th centuries in France, the effect of grandparents' occupational status on that of their grandchildren became weaker because the living distance between grandparents and grandchildren became larger.

2.4. Historical trends of gender-specific variances in grandparents' influence

In the second half of the 20th century, the gender roles of women at home and in the labour market were redefined in European countries. Using the national TRA sample, Zijdeman et al. (2014) found that from 1860 to 1950, female labour force participation remained relatively stable and increased rapidly until 1970. Societies gradually move away from the breadwinner-homemaker norm to embrace a gender-egalitarian view: both men and women are expected to provide for the family financially but also equally engage in domestic work (Wunder, 2017). Thus, grandchildren can not only learn and imitate their same-sex grandparents during socialization; their imitation of different-sex grandparents is also accepted, and grandparents will be willing to impart career-related knowledge and skills to their different-sex grandchildren.

Furthermore, the reduction of gender segregation in the labour market may help to strengthen the non-gender-specific influence of grandparents. Over the long period since the mid-20th century, women not only worked more but also in more different types of occupations (Zijdeman et al., 2014). At first, women's increasing labour force participation was mainly in low-skilled and low-paid jobs or part-time jobs (Kong et al., 2020; Schulz, 2015). However, as women's education levels increased, a significant number of women entered occupations that were formerly almost exclusively male (Fox, 1987; Zijdeman et al., 2014), such as teaching in schools, working in an office or even the administration of a large company (Schulz et al., 2014; Schulz, 2015). Besides, women's increased education attainment also allows them to work in new industries and the services sector (Vanhaute, 2002). The laws and decrees adopted since the mid-20th century, especially La loi Roudy in 1983, requiring employers to eliminate gender discrimination also foster occupational equality between women and men (Meurs & Pora, 2019). Therefore, grandmothers who have worked after the mid-20th century may have more experience, skills, and knowledge in different fields and be able to pass these on to their grandchildren. Besides, since granddaughters are more likely to enter the labour market than in the past, grandfathers will be willing to pass on career knowledge and skills to their

granddaughters. Hence, the positive influence of grandparents' occupational status on their different-sex grandchildren's occupational status could be stronger.

H4. During the 19th and 20th centuries in France, the cross-gender effects of grandparents' occupational status on that of their grandchildren became stronger.

3. Data and methods

3.1. Data

The dataset employed in this study originates from the TRA survey, which was launched in the 1980s to build a historical database at the individual level of a representative sample of the population in France. The TRA survey is based on the systematic reconstitution of civil birth, marriage, divorce and death certificates for all French persons whose surnames begin with the three letters "TRA" (van Leeuwen et al., 2016). The TRA survey yields genealogical data, commencing with 3,000 couples who married between 1803 and 1832, and tracing all descendants of these families into the 20th century (Bourdieu et al., 2014).

Utilizing TRA data has several notable advantages. Firstly, compared to other historical data, TRA data has a wealth of information regarding females' occupations. Recorded females include those with the "TRA" surname and those who entered the TRA families as spouses through marriage. Secondly, the observed time of TRA data spans over two centuries, with approximately 88% of the individuals born between 1800 and 2000. This longitudinal breadth facilitates the investigation of changes in grandparental effects on status attainment over time.

The particular version of TRA (Genealogique) I used encompasses a comprehensive array of data, including information on (i) dates and places of birth, marriage, death and residency, (ii) occupation titles, and (iii) unique identification codes of individuals' TRA family (SOU and TRA) and their positioning within family trees (SOSA). This dataset comprises 84,421 persons from 2302 TRA distinct families. Specifically, the dataset incorporates all descendants of these 2302 TRA families, all spouses who married persons with TRA surnames and some of these spouses' parents.

3.2. Sample selection and data transformation

Given that the persons in the dataset could be any of grandchildren, parents, or grandparents, I first selected the grandchildren sample and then amalgamated information pertaining to grandchildren with that of their respective grandparents and parents.

I made the following selections to exclude individuals whose grandparents are not included in the dataset originally: (i) deleted individuals who are spouses of TRA persons (persons with TRA surname) and individuals identified as parents of spouses married to TRA persons (N=31,511; N refers to the remaining grandchildren samples, which also applies to the following text), (ii) excluded individuals who are the first or second generation in TRA data (N=19,621), (iii) removed individuals who are the only person in their family (N=19,553). Further consideration of available information on individuals' grandparents leads to these selections: (i) because the identification codes of belonging to a certain TRA family are essential to linking individuals with their parents and grandparents, individuals lacking valid information on these identification codes were excluded (N=19,520), (ii) each combination of all identification codes should uniquely identify an individual, so duplicated individuals were eliminated (N=19,484), (iii) a few individuals for which there seems to be a minor mistake in their valid identification codes, making it impossible to identify their grandparents. After selections, this study attained a grandchildren sample with 19,422 persons from 653 TRA families (NGranddaughter=9,264 , NGrandson= 10,158).

Based on the identification codes of positions in the family trees of individuals, I extracted all identification codes of positions in the family trees of grandchildren's parents and grandparents, and merged them with the grandchildren sample data. Next, I merged the original TRA data with grandchildren sample data for each grandchildren's parents and grandparents separately by the combination of all identification codes of them. Through this step, I attained all parents' and grandparents' information of all grandchildren. This transformation process yielded a new dataset structured suitably for this study's statistical analysis, consolidating information pertaining to grandchildren along with that of their parents and grandparents in a unified row.

Missing values in historical data are usually more common and complex than in contemporary survey data. I applied the listwise deletion method dealing with the missing values on some of the key variables, leading to the additional loss of the grandchildren sample, which I will further explain in the next section. After handling the missing information, this study ends up having 2,000 granddaughters and 4,130 grandsons from 518 TRA families for analysis.

3.3. Measurement

3.3.1. Dependent variables and independent variables

The dependent variables are the Occupational status of grandchildren, and the analysis will be conducted for granddaughters and grandsons separately. The main independent variables are the Occupational status of grandmothers and the Occupational status of grandfathers. Within the TRA dataset, individuals are recorded with up to five different occupations based on chronological order throughout their lifetimes. Grandparents' occupational status is measured by the last occupation since the last occupation most reveals their accumulative resources, which could be transferred to the grandchildren; and grandchildren's occupational status is measured by the first occupation, because the first job is usually most influenced by family background during their whole career life (Warren et al., 2002).

Occupation measurements vary across regions and periods, hence, historical studies of social mobility encounter comparability challenges. To address this issue, the Historical International Standard Classification of Occupations (HISCO) emerges as a reliable tool, as demonstrated in prior research. HISCO is adopted as the classification system in this study to categorize the occupations documented in the TRA dataset. Occupational titles in the TRA dataset that exactly match occupational titles in HISCO can be directly assigned HISCO codes through merging with a HISCO code book specific to France. However, manual coding is required for occupational titles that have not been coded before. In total, there are 592 occupational titles for which I have assigned HISCO codes.

Then, I use the universal scale of HISCAM (historical CAMSIS) to translate occupational classification into a scale score (Lambert et al., 2013). Based on the HISCO occupational coding scheme, HISCAM was created to provide an internationally comparable stratification scale for occupations in historical contexts. The analysis of the specific version of HISCAM I used was performed on data from 1800 to 1938 for both males and females, principally derived from marriage registers covering seven countries: Belgium, Britain, Canada, France, Germany, the Netherlands, and Sweden (Lambert et al., 2013). Therefore, HISCAM is an occupation-based stratification measure suitable for these countries during the 19th and 20th centuries. The scale scores assigned to occupations denote the position within the social stratification structure of people holding those occupations. Theoretically, the scale ranges from 1 to 99, with higher values indicative of higher occupational status. Notably, in this study, it ranges from 37.18 to 99.

As this study aims to predict the grandchildren's occupational status, I used the listwise deletion method to remove 42.5% of grandsons and 50.4% of granddaughters lacking information on their occupation before generating their occupational status. Among the grandchildren with missing values on occupation, I

calculated their longevity if they have available information on both the year of birth and death, observing that 54.5% of grandsons and 45.5% of granddaughters died before age 16. Therefore, early mortality before individuals can work could be the main reason for grandchildren not having occupation information. Besides, missing values in granddaughters' occupations are likely due to the reason that some of them were not in the labor market, which also applies to explain part of the missing values of other females in the family, such as mothers and grandmothers. Women also have a greater proportion of occupational missing than men in other generations; specifically, 43.7% of grandmothers and 34.6% of mothers were deficient in occupational information, compared to only 8.8% of grandfathers and 12.3% of fathers who had no valid occupational information.

Missing values for an individual's occupational status may be generated not only due to missing occupational information in the TRA data, but also during the process of assigning corresponding HISCO and HISCAM. Except for those occupational titles without assigned HISCO leading to missing on HISCAM, HISCO with particular values (e.g. -1, -2, 1, 2, 99, 98, 99999) also causes missing on HISCAM since these particular values have been considered as missing on HISCO. The reasons for these particular values could be that the occupational title is not detailed enough to recognize a specific occupational classification or that the person is a homemaker. Besides, a few non-special HISCOs (n=43) also do not have a matching HISCAM, and I assigned them a new HISCO according to their original occupational titles. The listwise deletion method was used again to remove grandchildren who were missing their occupational status.

There are 66.4% of grandmothers, 14.5% of grandfathers, 62.9% of mothers and 20.4% of fathers still have missing on their occupational status (HISCAM) in the final sample after all selections. Three possible methods could be used to treat these missing values: listwise deletion, mean/median substitution and multiple imputation. Since the amount of missing data is quite large and the pattern of missing is not completely random, the utilization of listwise deletion will lead to biased analysis and thus not a reasonable approach in this study. Mean/median substitution and multiple imputation do not lead to a substantial loss of samples. Multiple imputation method is more complex and tricky, since most previous implementations, evaluations and applications of the approach focus on the context of two-level data, and conventional methods for multilevel multiple imputation often do not properly take the nonlinear associations between the variables such as interactions into account (Grund et al., 2021; Wijesuriya et al., 2020). Even though multiple imputation is not adopted currently in this study, it is still a worthwhile attempt in further study. This study

adopted the median imputation instead of the mean imputation because the occupational status distributions of both parents and grandparents are right-skewed, and four dummy variables are created to indicate whether their occupational status has been imputed.

3.3.2. Moderators

Shared lifetime: This variable refers to the number of years of overlapping lifetime between grandparents and their grandchildren. There are 16.3% of grandfathers and 52% of grandmothers who have missing information on their death year. Since this study is primarily interested in investigating whether grandmothers' occupational status had an effect on grandchildren's occupational status, I did not want to lose too many grandmothers by testing for moderating effects. Therefore, I decided to focus only on how the overlapping lifetime of grandfathers and grandchildren moderated the effect of the grandfather's occupational status on the grandchildren's occupational status. I used listwise deletion to remove grandchildren with missing information on their birth year (1%) and grandchildren whose grandfathers are without valid information on their death year (16.3%). In terms of operationalization, this variable is obtained by subtracting the grandchildren's birth year from the grandfather's year of death. A negative value signifies that the grandfathers passed away prior to the grandchildren's birth and will be recorded as 0. This approach is adopted because this study does not expect the grandparental influence diminish the longer before the birth the grandfathers died. The variable spans a range from 0 to 53 years in the dataset ($M=6.7$, $SD=9.4$).

Living distance: Living distance is constructed as a numerical variable representing the geographical distance (in kilometers) between grandparents' place of residence (separately for grandfathers and grandmothers) and grandchildren's place of residence. There are 56.6% of granddaughters, 53.4% of grandsons, 17.7% of grandfathers and 41% of grandmothers who have missing information on their residence place code. I first used the marriage place code to fill in the missing value, and if the marriage place code was missing, I then used the birthplace code for imputation. With the assumption that grandmothers and grandfathers lived together, I used the grandfather's residence code to further replace the missing in the grandmother's residence code. The remaining missing samples will be removed using the listwise deletion (4.8% of granddaughters, 6.6% of grandsons, 6.1% of grandfathers and 5.6% of grandmothers). By merging with a dataset containing commune codes and their corresponding latitude and longitude coordinates from the French National Institute of Statistics and Economic Studies (INSEE), I

obtained the latitude and longitude coordinates for the grandparents' and grandchildren's residences. Subsequently, utilizing these coordinates, I calculated the geometric distances in meters. The results were divided by 1000 to convert the distances into kilometers.

Time: Consistent with the approach adopted by Knigge (2016) and Kong et al. (2020), Time is operationalized by the year in which grandsons or granddaughters reach the age of 15 minus the first observed year (1765), and then divided by 10.

3.3.3. Control variables

This study includes several control variables. At the individual level, birth order among siblings of grandchildren is taken into account as it can influence the amount of resources or care a grandchild receives from his or her grandparents. At the family level, the occupational status of mothers and the occupational status of fathers are controlled. Since the influence of grandparents on grandchildren may be mediated through parents, and this study aims to examine the direct effects of grandparents' occupational status on grandchildren's occupational status. Besides, four dummy variables, indicating the imputation status of parents' and grandparents' occupational status, respectively, are also included as controls ("1" coded for imputation and "0" for not). Table 1 shows all the variables used in this study and the corresponding measurement and missing value treatments.

Table 1. Measurement and missing value handling of variables.

	Variable	Measurement	Missing
Dependent Variable	Occupational status of granddaughters and grandsons	First occupation →HISCO→HISCAM	Listwise deletion
Independent Variable	Occupational status of grandmothers and grandfathers	Last occupation →HISCO→HISCAM	Median imputation
Moderator	Shared lifetime with grandfathers	The number of years of shared lifetime between grandfathers and grandchildren	Listwise deletion on birth year of grandchildren and death year of grandfathers
	Living distance with grandfathers/grandmothers (in kilometers)	Geographical distance between grandfathers'/grandmothers' place of residence and grandchildren's place of residence	Marriage place and birth place for imputation first, then listwise deletion for the remaining missing after imputation
	Time	Time is measured by the year that grandchildren reach the age of 15 minus the first observed year (1765), and then divided by 10	
Control Variable	Occupational status of mothers and fathers	Last occupation →HISCO→HISCAM	Median imputation
	Birth order	Birth order among siblings	Listwise deletion

	Imputation on occupational information for fathers/mothers/grandfathers/grandmothers	This set of dummy variables are coded as “1” if the missing value is filled by the median value, otherwise coded as “0”	
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3.4. Analytical strategy

I perform multilevel linear regression with three levels (individuals, parents, grandparents) and conduct separate analyses on the occupational status attainment of granddaughters and that of grandsons. First, I start by estimating the intercept-only model as the baseline model to describe how large the influence of the family is on occupational status attainment. Second, I add controls in the Model 2, including fathers’ occupational status, mothers’ occupational status, time and grandchildren’s birth order among siblings. Subsequently, in order to test the positive effects of grandparents’ occupational status (H1a) and the gender-specific effects of grandparents’ occupational status (H2a and H2b), I add grandfathers’ occupational status and grandmothers’ occupational status to the Model 2. Fourth, to test the moderating effect of shared lifetime (H1b), I subsequently add the interaction of it with grandfathers’ occupational status in Model 4. In Model 5, I further test the moderating effect of living distance (H1c) for grandfathers by adding the interaction term of living distance (between grandfathers and grandchildren) and grandfathers’ occupational status. In Model 6, the interaction of living distance (between grandmothers and grandchildren) with grandmothers’ occupational status is included to test H1c.

In the second part of analyses, I test the hypotheses on changes of the influence of grandparents’ occupational status on grandchildren’s status attainment over time. First, to test the changing gender-specific effects of grandparents’ occupational status (H4), I include time (as a numeric variable), interaction between time and grandfathers’ occupational status, and interaction between time and grandmothers’ occupational status in Model 7. Further, to test changing moderating effects of shared lifetime (H3a) and living distance (H3b), I will additionally add the interactions of them with time based on Model 7.

4. Results

4.1. Descriptive results

Table 2 presents the descriptive characteristics of the variables under study. On average, granddaughters exhibit an occupational status of 59.46, approximately one unit higher than grandsons, whose mean occupational status stands at 58.49. This discrepancy may be attributed to positive selection among

women in the labor market. The majority of women were not in the labor market, and those who entered the labor market were generally better educated and therefore had a higher occupational status on average. Notably, this rationale does not uniformly extend to the preceding generations of mothers and grandmothers, characterized by lower educational attainment and limited access to high-status occupations. Grandfathers exhibit an average occupational status three units higher than grandmothers, while fathers surpass mothers by over four units in mean occupational status. Furthermore, granddaughters and grandsons each share an average of 6.68 and 6.77 years, respectively, of overlapping lifetime with their grandfathers. The average living distance separating granddaughters from their grandfathers measures 91.22 kilometers, representing a marginal increase of 4.2 kilometers compared to grandsons' average living distance with their grandfathers.

Table 2. Descriptive statistics of all variables.

	Granddaughters (N=2,000)				Grandsons (N=4,130)			
	Mean	SD	Min	Max	Mean	SD	Min	Max
Dependent variable								
Occupational status	59.46	13.10	37.18	99	58.49	10.86	37.18	99
Independent variables								
Grandfathers' status	53.12	8.26	41.43	99	53.22	8.78	41.43	99
Grandmothers' status	50.50	3.71	37.18	88.41	50.31	3.50	37.18	95.41
Moderators								
Shared lifetime	6.68	9.59	0	44	6.77	9.35	0	53
Living distance with grandfathers (km)	91.22	159.18	0	1035.17	87.02	164.03	0	1124.52
Living distance with grandmothers (km)	92.19	159.21	0	1035.17	87.44	161.32	0	1041.05
Time	15.37	3.79	1.90	22.50	14.67	3.57	1.50	22.70
Control variables								
Birth order	2.94	2.21	1	20	2.85	2.19	1	16
Fathers' status	55.82	9.77	37.18	99	55.33	9.46	37.18	99
Mothers' status	51.29	5.86	37.18	99	51.12	5.59	37.18	99

Time is measured by the year that grandchildren reach the age of 15 minus the first observed year (1765), and then divided by 10.

Figure 1 shows the density plots of occupational status across different generations. The density distributions of occupational status for all individuals exhibit right-skewed patterns, with concentrations predominantly observed in the low to middle range of occupational status. The occupational status distribution of grandchildren is less centralized than that of their parents and grandparents. This is in line with the fact that, with industrialization, there are more occupational choices for people, and they are no longer concentrated in traditional agriculture and handicrafts, which have a relatively lower status. The density peak of occupational status for granddaughters is centered around values of approximately 60, while

for grandsons, it hovers around values of approximately 50. This observation aligns with the previously noted difference where the average occupational status of granddaughters is slightly higher than that of grandsons. The density peak of grandmothers' occupational status surpasses that of the others, suggesting that the vast majority of grandmothers are clustered in a particular occupational status, and in conjunction with Table 3, the occupation corresponding to this occupational status is the farmer. Furthermore, contrasting their mothers and grandmothers, granddaughters are predominantly engaged in emerging service sector occupations, such as salespersons. Conversely, grandsons frequently pursue occupations such as railroad clerks and machine fitters, indicative of shifting occupational opportunities and preferences across generations.

Figure 1. Density of occupations status.

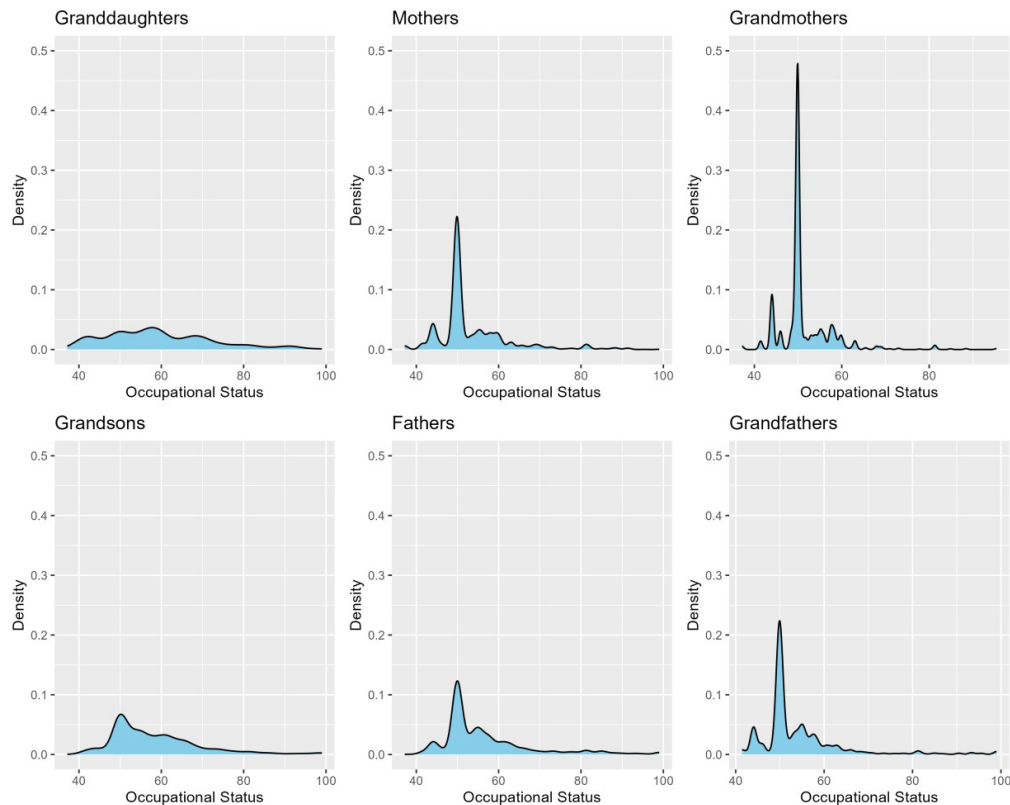


Table 3. Most-frequent occupations.

Granddaughters			Grandsons		
HISCO	Description	Frequency	HISCO	Description	Frequency
61110	Farmer	211	61110	General Farmer	909
79140	Dressmaker	167	99920	Day-Labourer	125
54010	Domestic servant (General)	134	95410	Railway Clerk	105
99920	Day-Labourer	79	39960	Carpenter (General)	103
45125	Salesperson	75	84100	Machinery Fitter/Assembler	99
Mothers			Fathers		
HISCO	Description	Frequency	HISCO	Description	Frequency
61110	General Farmer	933	61110	General Farmer	1448
99920	Day-Labourer	213	99920	Day-Labourer	304
75400	Weaver	75	99910	Labourer	129
79140	Dressmaker	65	95135	Bricklayer or Stonemason	115
41025	Working Proprietor	43	75400	Carpenter, General	102
Grandmothers			Grandfathers		
HISCO	Description	Frequency	HISCO	Description	Frequency
61110	General Farmer	990	61110	General Farmer	1864
99920	Day-Labourer	199	99920	Day-Labourer	459
75400	Weaver	80	99910	Labourer	165
62430	Sheep Farm Worker	51	75400	Weaver	140
99910	Labourer	41	61220	Seamstress	110

4.2. Grandparental effects on occupational status attainment

Model 1 presented in Table 4 and Table 5 serves as the baseline model for assessing granddaughters' and grandsons' occupational status attainment, incorporating solely the intercept term. The variances observed at the grandparent level are substantial, standing at 68.16 (39% of all variance) for granddaughters and 45.60 (37% of all variance) for grandsons within Model 1, which indicates that grandchildren sharing the same set of grandparents exhibit greater similarity in terms of occupational status compared to randomly selected individuals.

Model 2 in Tables 4 and 5 introduces control variables beyond the baseline Model 1. The inclusion of fathers' occupational status reveals a significant positive effect on both their daughters' ($B = 0.32$, $p < 0.001$) and sons' occupational status ($B = 0.45$, $p < 0.001$). A one-unit increase in fathers' occupational status corresponds to a 0.32 increase in daughters' occupational status and a 0.45 increase in sons' occupational status. Mothers' occupational status also demonstrates a significantly positive effect on their children's status ($B = 0.21$, $p < 0.001$ for daughters and $B = 0.13$, $p < 0.001$ for sons respectively). For every unit increase in the mothers' occupational status, the granddaughters' occupational status increases by 0.21 and that of

grandsons by 0.13. For both granddaughters' and grandsons' status, the effect size of mothers' occupational status is observed to be smaller than that of the fathers'. Moreover, birth order exerts a significant negative impact on the occupational status of granddaughters ($B = -0.62, p < 0.001$) and grandsons ($B = -0.18, p < 0.01$). This implies that with increasing birth order, a decrement in occupational status is observed for both genders. Over time, women's occupational status ($B = 1.30, P < 0.001$) and men's occupational status ($B = 0.66, P < 0.001$) increased. The occupational status of granddaughters with missing information on mothers' status is estimated to be 1.21 points above that of granddaughters with mothers with median status. The occupational status of grandsons with missing information on fathers' status is estimated to be a bit higher than that of grandsons with fathers with median status ($B = 2.43, P < 0.001$), and the similar pattern is observed for mothers' status ($B = 1.09, P < 0.01$).

To test hypothesis H1a, Model 3 in Tables 4 and 5 includes grandfathers' and grandmothers' occupational status. The results indicate a significant positive effect of grandfathers' occupational status on both granddaughters' ($B = 0.15, p < 0.001$) and grandsons' occupational status ($B = 0.19, p < 0.001$). Specifically, for every unit increase in grandfathers' occupational status, there is an increase of 0.15 units in granddaughters' occupational status and 0.19 units in grandsons' occupational status. However, the effects of grandmothers' occupational status on both granddaughters' and grandsons' occupational status are not statistically significant. Thus, hypothesis H1a, positing that grandparents' occupational status positively influences grandchildren's occupational status, is partly supported. Hypothesis H2a and H2b can also be tested using Model 3. Hypothesis H2a, proposing a stronger effect of grandmothers' occupational status on that of granddaughters compared to grandfathers, is refuted. Conversely, hypothesis H2b, suggesting a stronger effect of grandfathers' occupational status on that of grandsons compared to grandmothers, is supported by the results.

Model 4, as presented in Tables 4 and 5, explores the potential moderating effects of overlapping lifetime between grandfathers and their grandchildren, separately for granddaughters and grandsons. However, neither the main effects nor the interaction terms yield statistically significant results. Consequently, hypothesis H1b, proposing a positive moderating effect of shared lifetime between grandchildren and grandparents, is rejected. Moving to Model 5, which examines the moderating effects of living distance between grandfathers and their grandchildren, separately for granddaughters and grandsons, the findings reveal that the main effect and interaction terms of living distance are not statistically significant

for granddaughters. Conversely, for grandsons, while the main effect of living distance proves to be statistically significant ($B = 2.71$, $p < 0.001$), the interaction term does not attain statistical significance. Model 6 aims to test the moderating effects of living distance between grandmothers and their grandchildren, while no such significant effects have been observed. Hence, hypothesis H1c, positing a negative moderating effect of living distance on the relationship between grandchildren's status and grandparents' status, is rejected. The inclusion of the two moderating variables (shared lifetime and living distance) and their interaction terms with grandfathers' occupational status in the model resulted in an increase rather than a decrease in unexplained variance at the grandparent level. The results of AIC and BIC in Model 4, Model 5 and Model 6 indicate that the addition of moderators did not improve model fit. These results collectively underscore the limited role of overlapping lifetime and living distance in moderating the relationship between grandchildren's occupational status and grandparents' occupational status.

We can assess how much variance at the grandparent level is captured by including grandparents' occupational status. Model 2 and Model 3 in Table 6 demonstrate that for granddaughters, the unexplained variance at the grandparent level was reduced by 3%, from 14.18 to 13.70. Table 7 reveals a more substantial reduction in unexplained variance for grandsons, amounting to 30%, from 7.69 to 5.39. Besides, the AIC and BIC values show that, for grandsons, Model 3, incorporating grandfathers' and grandmothers' status, leads to a superior fit compared to a model solely including fathers' and mothers' status.

Table 4. Multilevel regression models of granddaughters' occupational status attainment ($N=2,000$).

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Fixed part						
Intercept	60.48*** (0.36)	12.12*** (2.96)	4.41 (4.60)	3.43 (4.87)	5.36 (4.62)	6.07 (4.63)
Grandfathers' status			0.15*** (0.04)	0.17*** (0.04)	0.16*** (0.04)	0.15*** (0.04)
Grandmothers' status			0.08 (0.07)	0.08 (0.08)	0.08 (0.07)	0.08 (0.08)
Shared lifetime				0.14 (0.18)		
Shared lifetime * Grandfathers' status				0.00 (0.00)		
Living distance with grandfathers					2.03 (1.25)	
Living distance * Grandfathers' status					-0.02 (0.02)	
Living distance with grandmothers						-2.24 (3.23)
Living distance * Grandmothers' status						0.06 (0.06)

Time		1.30*** (0.08)	1.28*** (0.08)	1.27*** (0.08)	1.26*** (0.08)	1.26*** (0.08)
Birth order		-0.62*** (0.11)	-0.62*** (0.11)	-0.60*** (0.11)	-0.62*** (0.11)	-0.63*** (0.11)
Fathers' status		0.32*** (0.03)	0.26*** (0.03)	0.26*** (0.03)	0.25*** (0.03)	0.25*** (0.03)
Mothers' status		0.21*** (0.05)	0.19*** (0.05)	0.19*** (0.05)	0.18*** (0.05)	0.18*** (0.05)
Father imputation		0.84 (0.70)	0.82 (0.69)	0.83 (0.69)	0.78 (0.69)	0.74 (0.69)
Mother imputation		1.21* (0.59)	1.03 (0.59)	1.03 (0.59)	0.91 (0.59)	0.91 (0.59)
Grandfather imputation		1.49 (0.82)	2.14* (0.83)	2.01* (0.83)	2.26** (0.83)	2.21** (0.83)
Grandmother imputation		0.49 (0.59)	0.46 (0.61)	0.49 (0.61)	0.41 (0.60)	0.43 (0.60)
Random part						
Variance (Individual level)	67.96	69.85	70.02	70.05	70.52	70.35
Variance (Parent level)	38.89	36.18	35.02	34.57	35.00	35.12
Variance (Grandparent level)	68.16	14.18	13.70	14.05	12.21	12.44
Log Likelihood	-7820.10	-7558.40	-7549.00	-7548.40	-7544.00	-7544.70
AIC	15648.4	15152.8	15146.2	15163.9	15146.9	15146.3
BIC	15670.8	15220.0	15224.6	15253.5	15236.6	15235.9

Standard errors are shown in parentheses; ***p < .001; **p < .01; *p < .05

Living distance with grandfathers and Living distance with grandmothers have been centered around the mean.

Table 5. Multilevel regression models of grandsons' occupational status attainment (N=4,130).

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Fixed part						
Intercept	59.28*** (0.23)	16.64*** (1.80)	7.98** (2.87)	7.59* (3.06)	10.93*** (2.86)	11.06*** (2.84)
Grandfathers' status			0.19*** (0.02)	0.20*** (0.03)	0.19*** (0.02)	0.18*** (0.02)
Grandmothers' status			0.08 (0.05)	0.08 (0.05)	0.08 (0.05)	0.09 (0.05)
Shared lifetime				0.02 (0.10)		
Shared lifetime * Grandfathers' status				0.00 (0.00)		
Living distance with grandfathers					2.71*** (0.73)	
Living distance * Grandfathers' status					-0.02 (0.01)	
Living distance with grandmothers						4.23 (2.36)
Living distance * Grandmothers' status						-0.05 (0.05)
Time		0.66*** (0.05)	0.64*** (0.05)	0.64*** (0.05)	0.58*** (0.05)	0.58*** (0.05)
Birth order		-0.18** (0.07)	-0.18** (0.07)	-0.20** (0.07)	-0.19** (0.07)	-0.19** (0.07)

Fathers' status		0.45*** (0.02)	0.38*** (0.02)	0.38*** (0.02)	0.35*** (0.02)	0.34*** (0.02)
Mothers' status		0.13*** (0.03)	0.11*** (0.03)	0.11*** (0.03)	0.10*** (0.03)	0.10*** (0.03)
Father imputation		2.43*** (0.41)	2.26*** (0.40)	2.27*** (0.40)	2.05*** (0.39)	2.08*** (0.39)
Mother imputation		1.09** (0.36)	0.90* (0.36)	0.90* (0.36)	0.77* (0.35)	0.76* (0.35)
Grandfather imputation		0.39 (0.47)	1.23** (0.47)	1.26** (0.47)	1.17* (0.46)	1.13* (0.46)
Grandmother imputation		0.17 (0.37)	0.01 (0.37)	-0.01 (0.37)	-0.12 (0.36)	-0.12 (0.36)
Random part						
Variance (Individual level)	59.81	60.24	60.47	60.43	59.27	59.51
Variance (Parent level)	18.04	19.76	19.27	19.40	17.93	17.68
Variance (Grandparent level)	45.60	7.69	5.39	5.27	5.59	5.53
Log Likelihood	-15430.20	-14990.70	-14947.00	-14946.20	-14892.00	-14892.50
AIC	30869.6	30026.4	29953.4	29973.0	29856.5	29855.1
BIC	30894.9	30102.3	30042.0	30074.2	29957.8	29956.3

Standard errors are shown in parentheses; ***p < .001; **p < .01; *p < .05

Living distance with grandfathers and Living distance with grandmothers have been centered around the mean.

4.3. Historical trends of grandparental effects

In the second part of the analysis, I investigated how the effects of grandparental occupational status on grandchildren's occupational status changed over time. Model 7.1 and Model 7.2 in Table 6 separately examined the historical trends of grandparental effects on granddaughters and grandsons by incorporating interaction terms between time and grandparent's occupational status. Considering the possible changes in parental effects on individuals' occupation status that could influence the changes in grandparental effects, I included the interaction terms between time and both parents' occupational status as control variables.

For granddaughters, neither the main effects nor the interaction terms prove statistically significant, suggesting the absence of significant historical trends in both grandfathers' and grandmothers' influence on granddaughters' occupational status. For grandsons, the main effects of time ($B = 3.56$, $p < 0.001$) and grandfathers' occupational status ($B = 0.33$, $p < 0.001$) attain statistical significance. However, the interaction terms between time and both grandparents' status fail to reach statistical significance. The impact of grandfathers' and grandmothers' occupational status on that of their grandsons did not change over time. Thus, hypothesis H4, which assumes that the cross-gender effects of grandparents' occupational status on that of their grandchildren became stronger over time, is refuted. Since the previous analyses did not yield significant results for the moderating effects of shared lifetime and living distance, and the interaction terms

between time and both grandparents' occupational status were also not significant, further model construction to examine hypotheses H3a and H3b was not pursued.

In Model 7.2 for grandsons, the interaction terms of time with both parents' occupational status are statistically significant. Over time, the positive influence of fathers' occupational status on their sons' occupational status becomes weaker ($B = -0.01$, $p < 0.01$). Historical trends in the influence of mothers on their sons shared a similar weakening pattern ($B = -0.02$, $p < 0.05$).

Table 6. Historical trends of grandparental effects.

	Granddaughters(N=2,000) Model 7.1	Grandsons (N=4,130) Model 7.2
Fixed part		
Intercept	-0.99 (22.80)	-41.50** (12.77)
Grandfathers' status	0.12 (0.16)	0.33*** (0.08)
Grandmothers' status	0.27 (0.38)	0.28 (0.20)
Time	1.58 (1.29)	3.56*** (0.75)
Time * Grandfathers' status	0.00 (0.01)	-0.01 (0.01)
Time * Grandmothers' status	-0.01 (0.02)	-0.01 (0.01)
Birth order	-0.62*** (0.11)	-0.20** (0.07)
Fathers' status	0.32* (0.15)	0.61*** (0.08)
Mothers' status	0.08 (0.25)	0.49** (0.16)
Father imputation	0.79 (0.70)	2.16*** (0.40)
Mother imputation	1.03 (0.59)	0.87* (0.36)
Grandfather imputation	2.17** (0.84)	1.20** (0.46)
Grandmother imputation	0.45 (0.61)	0.05 (0.37)
Time * Fathers' status	0.00 (0.01)	-0.01** (0.01)
Time * Mothers' status	0.01 (0.01)	-0.02* (0.01)
Random part		
Variance (Individual level)	69.96	60.12
Variance (Parent level)	35.05	19.34
Variance (Grandparent level)	13.70	4.99
Log Likelihood	-7548.70	-14931.80
AIC	15181.4	29963.3
BIC	15282.2	30077.2

Standard errors are shown in parentheses; *** $p < .001$; ** $p < .01$; * $p < .05$

Living distance with grandfathers and Living distance with grandmothers have been centered around the mean.

5. Conclusion and discussion

This research studied the effects of grandparents' occupational status on grandchildren's status in the 19th and 20th centuries in France. The findings show that, after controlling for both parents' occupational status, grandfathers' occupational status positively affected both grandsons' and granddaughters' status, and these grandfathers' influences were stable during the 19th and 20th centuries in France. However, no evidence supports that grandmothers' occupational status positively affected their grandchildren's status. Moreover, the results have not observed the moderating effects of overlapping lifetime and living distance on the relationship between grandparents' status and grandchildren's status.

The substantial influence of grandfathers' occupational status on their grandchildren's status shows that an intergenerational perspective is too narrow to represent the impact of family background on the status attainment process in the historical context. The modernization process is accompanied by a shift from ascription to achievement, meaning that the influence of family background on status attainment decreases over time (Blau & Duncan, 1976; Treiman, 1970). However, consistent with previous studies by Dribe et al. (2016) and Knigge (2016), we did not capture a diminution of grandfathers' influence. Considering that we also did not find the positive moderating impact of the shared lifetime on the relationship between grandfathers' status and grandchildren's status, we can argue that the influence mechanism without direct contact of grandparental effects still plays a vital role over time, which allows grandfathers to retain their influence during the past two centuries. For instance, grandfathers could transfer their durable resources, such as money and land, to their grandchildren and help them attain higher occupational status. Even in the age of industrialization, such transfers of economic resources are still crucial because they help grandchildren improve their education and learn the appropriate knowledge and skills, which in turn lead to a better professional status (Checchi, 2006).

However, more caution must be exercised in drawing conclusions about the impact of grandfathers' status on grandchildren's status. We must rule out the possibility that some or all of the observed grandfathers' effects can be statistical artifacts due to the impossibility of perfectly measuring all of the relevant resources in the intermediate generation (Clark, 2015). On the one hand, other intermediate

generations, such as uncles and aunts, have not been considered in this study, while Kinggle's research on Dutch (2016) found that the influence of uncles was almost as large as that of grandfathers. Therefore, this study could still go further by including the status of uncles and aunts in the controls to estimate more pure impacts of grandfathers. On the other hand, some unmeasured parental characteristics (information not available in the TRA data), such as parental wealth, may also influence their children's occupational status. If the parents are wealthy, they have sufficient financial resources to invest in and support their children in getting well-educated and finding good jobs, in which case the impact of the grandfathers may not be as great.

This study did not find significant effects of grandmothers' occupational status on grandchildren's occupational status. The influence of grandmothers may have been weak indeed, since for most of the last two centuries women have not had a high socioeconomic status. Even when they had occupations, their occupational status may be lower than that of their husbands. The person with the stronger labour force attachment and higher individual class position could potentially determine the family class position (Erikson, 1984), and the person in the family is usually the man. Grandmothers do not have the same resources as other men in the family, such as grandfathers and fathers, and in this kind of grandfather- or father-dominated family, grandmothers' influence on their grandchildren could be pretty weak. Besides, the systematic neglect of women's work in historical data may also contribute to the zero effects of grandmothers. Women's work can be seriously under-registered in registers and censuses since they are historical constructs that reflect the multiple purposes and prejudices of tiers of bureaucrats, enumerators, and householders (Humphries & Sarasúa, 2012). For instance, women's work was usually seasonal, irregular, interrupted, performed at home, unspecialized and unskilled, and consisted, in part, of subsistence production, which results in their work usually not being recognized and recorded as official occupations (Humphries & Sarasúa, 2012).

Due to the limitations of the data and measurements, some of the conclusions of this study are tentative. First, I studied only grandchildren who had an occupational title, which resulted in having to exclude a large part of the data. Women who had an occupation in the 19th and early 20th centuries more often originated from low-social-status families and probably also often married someone of similarly low status (Kong et al., 2020), while women who entered the labour market after the mid-20th century were usually well-educated from high-status families (Goldin, 1995). Thus, when examining the impact of

grandparents on the status of granddaughters, the data may show an over-representation of low-status families followed by an over-representation of high-low-status families. Second, I used median values to fill in missing values for grandparents' and parents' occupational status (66.4% of grandmothers and 14.5% of grandfathers). However, this strategy can reduce the variance and lead to bias in analysis. In some cases, the occurrence of missing values may not be random but instead have a certain pattern or context. For instance, the lack of information on women's occupations may be because they do not engage in paid work (e.g., they are only responsible for household chores), or it may be that they do not perceive themselves as engaging in activities that can be categorized as formal occupations. Further study can increase the robustness of the results by identifying specific patterns in the missing and applying more advanced techniques to deal with missing values.

Even though a growing body of research supports grandfathers' effects on grandchildren's status attainment in historical contexts, many unanswered questions are still held in this field. This study has tried to make grandmothers visible, but we did not find empirical evidence to support the idea that grandmothers' status can influence grandchildren's status. Considering that many women were homemakers in the past, future research with available data can focus on status transmission among working women over three generations on the one hand, and study whether grandmothers' employment status influences their grandchildren's status on the other hand.

References

- Acock, A. C., & Yang, W. S. (1984). Parental power and adolescents' parental identification. *Journal of Marriage and the Family*, 487-495.
- Beller, E. (2009). Bringing intergenerational social mobility research into the twenty-first century: Why mothers matter. *American Sociological Review*, 74(4), 507-528.
- Bengtson, V. L. (2001). Beyond the nuclear family: The increasing importance of multigenerational bonds. *Journal of Marriage and Family*, 63. 1.
- Blau, P. M., & Duncan, O. D. (1967). *The American occupational structure*. New York, Wiley.
- Bourdieu, J., Kesztenbaum, L., & Postel-Vinay, G. (2014). *L'enquête TRA, histoire d'un outil, outil pour l'histoire: Tome I. 1793-1902*. INED.
- Boyd, M. (1989). Family and personal networks in international migration: recent developments and new agendas. *International migration review*, 23(3), 638-670.
- Burnette, J. (2008). *Gender, work and wages in industrial revolution Britain*. Cambridge University Press.
- Chan, T. W., & Boliver, V. (2013). The grandparents effect in social mobility: Evidence from British birth cohort studies. *American Sociological Review*, 78(4), 662-678.

- Checchi, D. (2006). *The economics of education: Human capital, family background and inequality*. Cambridge University Press.
- Clark, L. L. (2000). *The rise of professional women in France: gender and public administration since 1830*. Cambridge University Press.
- Clark, G. (2015). *The Son Also Rises: Surnames and the History of Social Mobility: Surnames and the History of Social Mobility*. Princeton University Press.
- Dattani, S., Rodés-Guirao, L., Ritchie, H., Ortiz-Ospina, E., & Roser, M. (2023). Life Expectancy. Published online at OurWorldInData.org. Retrieved May 11, 2024, from <https://ourworldindata.org/life-expectancy>.
- Diebolt, C., Rijpma, A., Carmichael, S., Dilli, S., & Störmer, C. (Eds.). (2019). *Cliometrics of the Family*. Springer.
- Dribe, M., & Helgertz, J. (2016). The lasting impact of grandfathers: class, occupational status, and earnings over three generations in Sweden 1815–2011. *The Journal of Economic History*, 76(4), 969-1000.
- Dunifon, R. (2013). The influence of grandparents on the lives of children and adolescents. *Child Development Perspectives*, 7(1), 55-60.
- Erikson, R. (1984). Social class of men, women and families. *Sociology*, 18(4), 500-514.
- Erola, J., & Moisio, P. (2007). Social mobility over three generations in Finland, 1950–2000. *European sociological review*, 23(2), 169-183.
- Fox, B. J., & Fox, J. (1987). Occupational gender segregation of the Canadian labour force, 1931–1981. *Canadian Review of Sociology/Revue canadienne de sociologie*, 24(3), 374-397.
- Ganzeboom, H. B., Treiman, D. J., & Ultee, W. C. (1991). Comparative intergenerational stratification research: Three generations and beyond. *Annual Review of sociology*, 17(1), 277-302.
- Goldin, C. (1995). The U-shaped female labor force function in economic development and economic history. Pp. 61-90 in *Investment in Women's Human Capital and Economic Development*, edited by T.P. Schultz. Chicago: University of Chicago Press.
- Goldin, C., & Olivetti, C. (2013). Shocking labor supply: A reassessment of the role of World War II on women's labor supply. *American Economic Review*, 103(3), 257-262.
- Goldin, C. (2021). *Career and family: Women's century-long journey toward equity*. Princeton University Press.
- Goodsell, T. L., Bates, J. S., & Behnke, A. O. (2011). Fatherhood stories: Grandparents, grandchildren, and gender differences. *Journal of Social and Personal Relationships*, 28(1), 134-154.
- Grund, S., Lüdtke, O., & Robitzsch, A. (2021). Multiple imputation of missing data in multilevel models with the R package mdmb: A flexible sequential modeling approach. *Behavior Research Methods*, 53(6), 2631-2649.
- Haller, A. O., & Portes, A. (1973). Status Attainment Processes. *Sociology of Education*, 51-91.
- Hansen, M. N., & Wiborg, Ø. N. (2019). The accumulation and transfers of wealth: Variations by social class. *European Sociological Review*, 35(6), 874-893.
- Hertel, F. R., & Groh-Samberg, O. (2014). Class mobility across three generations in the US and Germany. *Research in Social Stratification and Mobility*, 35, 35-52.
- Humphries, J., & Sarasúa, C. (2012). Off the record: Reconstructing women's labor force participation in the European past. *Feminist Economics*, 18(4), 39-67.
- Janssens, A. (1997). The rise and decline of the male breadwinner family? An overview of the debate. *International Review of Social History*, 42(S5), 1-23.
- Jedwab, R., Christiaensen, L., & Gindelsky, M. (2017). Demography, urbanization and development: Rural push, urban pull and urban push?. *Journal of Urban Economics*, 98, 6-16.
- Knigge, A. (2016). Beyond the parental generation: The influence of grandfathers and great-grandfathers on status attainment. *Demography*, 53(4), 1219-1244.

- Kong, S., Maas, I., & van Leeuwen, M. H. (2020). Like my mother before me: gender and cross-gender effects on status attainment during modernization. *Research in Social Stratification and Mobility*, 69, 100541.
- Lambert, P. S., Zijdemans, R. L., Van Leeuwen, M. H., Maas, I., & Prandy, K. (2013). The construction of HISCAM: A stratification scale based on social interactions for historical comparative research. *Historical methods: a journal of quantitative and interdisciplinary history*, 46(2), 77-89.
- Lehti, H., Erola, J., & Tanskanen, A. O. (2019). Tying the extended family knot-Grandparents' influence on educational achievement. *European Sociological Review*, 35(1), 29-48.
- Li, A. (2023). Which grandparents? Multigenerational education associations by grandparent gender and paternal versus maternal Side. *Socius*, 9, 23780231231184221.
- Long, J., & Ferrie, J. (2018). Grandfathers matter (ed): occupational mobility across three generations in the US and Britain, 1850–1911. *The Economic Journal*, 128(612), F422-F445.
- Mare, R. D. (2011). A multigenerational view of inequality. *Demography*, 48(1), 1-23.
- Maynes, M. J. (1995). *Taking the hard road: Life course in French and German workers' autobiographies in the era of industrialization*. University of North Carolina Press.
- McBride, T. M. (1974). Social mobility for the lower classes: domestic servants in France. *Journal of Social History*, 8(1), 63-78.
- Meurs, D., & Pora, P. (2019). Gender equality on the labour market in France: A slow convergence hampered by motherhood. *Economie et Statistique*, 510(1), 109-130.
- Moch, L. P. (2003) *Moving Europeans: Migration in Western Europe since 1650*. Bloomington: Indiana University Press.
- Moulton, V., Flouri, E., Joshi, H., & Sullivan, A. (2017). The influence of grandparents' social class on children's aspirations. *British Journal of Sociology of Education*, 38(4), 500-517.
- Olivetti, C., Paserman, M. D., & Salisbury, L. (2018). Three-generation mobility in the United States, 1850–1940: The role of maternal and paternal grandparents. *Explorations in Economic History*, 70, 73-90.
- Rogers, R. (2020). *Educating Europeans*. Encyclopédie d'histoire numérique de l'Europe [online]. ISSN 2677-6588. Permalink: <https://ehne.fr/en/node/12271>
- Roser, M. (2020). It's not just about child mortality, life expectancy increased at all ages. Published online at OurWorldInData.org. Retrieved May 11, 2024, from <https://ourworldindata.org/its-not-just-about-child-mortality-life-expectancy-improved-at-all-ages>.
- Rosenfeld, R. A. (1978). Women's intergenerational occupational mobility. *American Sociological Review*, 36-46.
- Schulz, W., Maas, I., & Van Leeuwen, M. H. (2014). When women disappear from the labour market: Occupational status of Dutch women at marriage in a modernizing society, 1865–1922. *The History of the Family*, 19(4), 426-446.
- Schulz, W. (2015). Occupational career attainment of single women during modernization: The logic of industrialism thesis revisited. *European Societies*, 17(4), 467-491.
- Secombe, W. (1995). *Weathering the storm: Working-class families from the industrial revolution to the fertility decline*. Verso.
- Song, X., & Mare, R. D. (2017). Short-term and long-term educational mobility of families: A two-sex approach. *Demography*, 54(1), 145-173.
- Treiman, D. J. (1970). Industrialization and social stratification. *Sociological inquiry*, 40(2), 207-234.
- Vanhaute, E. (2002). Breadwinner models and historical models. Transitions in labour relations and labour markets in Belgium, 19th-20th centuries. In *The welfare state. Past, present, future* (pp. 59-76). Edizione Plus.
- Van Leeuwen, M. H. D., Maas, I., & Miles, A. (2002). *HISCO: Historical international standard classification of occupations*. Leuven: Leuven University Press.

- Van Leeuwen, M. H., & Zijdeman, R. L. (2014). Digital humanities and the history of working women: A cascade. *The History of the Family*, 19(4), 411-425.
- Van Leeuwen, M. H., Maas, I., Rébaudo, D., & Pélissier, J. P. (2016). Social mobility in France 1720–1986: Effects of wars, revolution and economic change. *Journal of Social History*, 49(3), 585-616.
- Volti, R. (2011). *An introduction to the sociology of work and occupations*. Sage Publications.
- Warren, J. R., & Hauser, R. M. (1997). Social stratification across three generations: New evidence from the Wisconsin Longitudinal Study. *American Sociological Review*, 561-572.
- Warren, J. R., Hauser, R. M., & Sheridan, J. T. (2002). Occupational stratification across the life course: Evidence from the Wisconsin Longitudinal Study. *American Sociological Review*, 67(3), 432-455.
- Wijesuriya, R., Moreno-Betancur, M., Carlin, J. B., & Lee, K. J. (2020). Evaluation of approaches for multiple imputation of three-level data. *BMC medical research methodology*, 20(1), 207.
- Wunder, H. (2017). Gender norms and their enforcement in early modern Germany. In *Gender Relations German Histor* (pp. 39-56). Routledge.
- Zijdeman, R. L., van Leeuwen, M. H., Rébaudo, D., & Pelissier, J. P. (2014). Working women in France, nineteenth and twentieth centuries. Where, when, and which women were in work at marriage?. *The History of the Family*, 19(4), 537-563.