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Multigenerational approaches to social mobility. A multifaceted research agenda☆

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1. Introduction

Empirical research on social mobility has an arguably proud and – in the case of sociology – long tradition (Black & Devereux, 2010; Bowles, Gintis, & Groves, 2005; Ganzeboom, Treiman, & Ultee, 1991; Hout & DiPrete, 2006; Morgan, Grusky, & Fields, 2006; Solon, 1999). For decades, scholars have debated the main determinants of intergenerational mobility (e.g. Blau & Duncan, 1967), its changing levels (e.g. Breen, 2004), cross-national differences and their explanations (e.g. Corak, 2004; Erikson & Goldthorpe, 1992), and – from time to time – the theoretical underpinnings of the models used to assess it (e.g. Becker & Tomes, 1986). And yet, one main assumption that has gone largely untested for all this time has been the idea that intergenerational social mobility should be measured as the similarity in socio-economic outcomes between parents and their offspring, that is, between *two* generations. This two-generation paradigm has most recently and forcefully been challenged by Robert Mare in his presidential address to the Population Association of America (Mare, 2011). Mare notes that thanks to the preponderance of mobility research that either implicitly or explicitly assumes that the intergenerational transmission of status does not extend beyond that from parents to their children, "[i]t is likely that we have overstated intergenerational mobility [. . .] or, at the very least, have misunderstood the pathways through which it occurs" (Mare, 2011, pp. 19–20).

This special issue brings together new work from sociologists, economists, and demographers as a response to Mare's call for more research on multigenerational mobility processes. The hope is that the issue will serve – alongside important recent and ongoing work (e.g. Chan & Boliver, 2013; Jaeger, 2012; Lindahl, Palme, Massih, & Sjögren, 2012; Mare & Song, 2012; Modin, Erikson, & Vå gerö, 2012; Roksa & Potter, 2011; Sharkey & Elwert, 2011; Warren & Hauser, 1997; Zeng & Xie, forthcoming) – to significantly advance this relatively young field of research. Naturally, the contributions assembled here provide many "first ever" pieces of evidence. For instance, we did not have direct cross-nationally comparative evidence on multigenerational associations in social class (Hertel and Groh-Samberg,

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2014), we did not know how similar first and even second cousins were to each other (Hällsten, 2014; Jaeger, 2012), and we did not relate individual outcomes to their grandparents' fertility outcomes (Fomby et al., 2014; Kolk, 2014).

Although the contributions assembled here provide answers to numerous new questions that have not received any prior empirical attention, they by no means address all of the new challenges brought about by a multigenerational approach. Mare did not simply suggest the addition of socio-economic indicators for grandparents and earlier ancestors to our existing empirical models, but instead argued for a much broader expansion of our view of mobility process, including a consideration of the influence of the extended family, such as non-resident contemporary kin (also see Jaeger, 2012), the study of the role of social institutions in shaping multigenerational processes – which, ultimately, amounts to a call for comparative research across time and place – and, finally and perhaps most importantly, the joint consideration of demographic and mobility processes (Duncan, 1966; Mare & Maralani, 2006), which I also briefly discuss below. In the next section, I discuss selected aspects of this broader multigenerational research agenda in an effort to provide an overview of some of the central unanswered questions lying ahead. In the following section, I point out some of the data sources available for multigenerational research and then focus on the Panel Study of Income Dynamics. I illustrate its use with a brief, original analysis of multigenerational educational mobility in the United States. The final section provides a brief summary of each contribution included here.

2. The road ahead

Early contributions to the literature on multigenerational processes necessarily focused on establishing baseline evidence on the degree of status transmission beyond two succeeding generations. The first major contribution to this literature by Warren and Hauser (1997) asked a seemingly simply question: "Are there direct three-generational socio-economic background effects?" The answer, based on evidence from the Wisconsin Longitudinal Study (WLS), was mostly no. There are nevertheless good arguments to revisit this question. I would summarize the core of those arguments as the possibility of significant heterogeneity in multigenerational mobility processes. Below, I consider how our evidence for and understanding of multigenerational processes may differ across (1) demographic groups and populations, (2) dimensions and strata of socio-economic status, (3) analytic approaches and theoretical perspectives. To be sure, many of these conceptual issues have been acknowledged by Mare (2011) and researchers are beginning to address them, including some of the contributors to this special issue. The list assembled here simply maps out the range of potential questions that this young field of research will need to address to flourish further.

2.1. Heterogeneity across groups and populations

It is likely that the importance of multigenerational processes differs across groups. For instance, one of the reasons why Mare calls to go beyond the existing evidence on three-generational effects from the Wisconsin Longitudinal Study (WLS) is that "mid-twentieth century Wisconsin families may be a population in which multigenerational effects are unusually weak" (Mare, 2011). In particular, there should also be a great deal of interest in multigenerational processes among *minority groups*, of which there are very few in the population covered by the WLS. The question whether upwardly mobile minorities are able to "pass the torch" is often acknowledged as one of high social importance and policy interest – and yet, empirical evidence is quite scarce (see Attewell & Lavin, 2009). An important exception, however, is the research on immigrant minorities, where the distinction of generational status (first, second, third, and various shades in-between) is well established (Alba & Nee, 2003; Portes & Rumbaut, 1996). Multigenerational research would be well served to critically assess where this literature can and where it cannot help us understand the transmission of inequality across multiple generations of non-immigrant minorities.

Patterns and levels of multigenerational mobility may also differ across *gender*. While mobility research has long distinguished the different mobility experiences of men and women (Hout & DiPrete, 2006), it has only recently begun to fully appreciate the importance of mobility experiences as they differ by the gender of parents. For instance, we now know that trends in two-generational mobility differ depending on whether we estimate them based on the status of fathers only or that of both parents (Beller, 2009). The logical next question for multigenerational research is whether grandfathers and grandmothers matter differently (Cherlin & Furstenberg, 1986)? And, also going beyond three generations, whether the influence of paternal and maternal lineages are distinct from each other and how these differences may have changed in relation to long-term historical trends in gender inequality. In addition, if research that assesses the independent impacts of

grandfathers and grandmothers or paternal and maternal lineages, respectively, shows that these impacts are at least in part additive, many of the existing estimates of multigenerational effects based on just one selected representative from those earlier generations are downwardly biased.

Finally, we should expect multigenerational mobility processes to differ across countries (or even geographic regions, see Chetty, Hendren, Kline, & Saez, 2014). The same institutional contexts that we know impact two-generational mobility, such as the design of national education systems and welfare state arrangements, may also structure mobility beyond two generations (Smeeding, Erikson, & Jäntti, 2011; Treiman & Ganzeboom, 2000). Other institutional arrangements may be hypothesized to be even more consequential for multiple rather than two-generation mobility: For instance, profound cross-national differences in the legal systems of inheritance taxation (Beckert, 2007) likely determine the degree to which certain families may concentrate and maintain socio-economic advantage across many generations. For those critical of the explanatory potential of comparative research, the mere description of cross-national differences in the level of multigenerational mobility may be interesting enough: Will a multigenerational perspective come to the rescue of the notion that the United States is marked by exceptionally high levels of intergenerational mobility (Beller & Hout, 2006; Corak, 2012)? That is, for example, will the aristocratic past of European nations show in much lower levels of multigenerational mobility? Or, alternatively, has early capitalist development established an industrialist class that has maintained its advantages to a much larger extent than economic elites in countries that prevented unfettered markets through regulation (Hall & Soskice, 2001)?

2.2. Heterogeneity across socio-economic dimensions and strata

Certainly, multigenerational influences could be studied for a range of outcomes, including cognitive and non-cognitive skills, attitudes, and behaviors. But even within a field that subscribes itself to a focus on socio-economic outcomes, there are still a great variety of different outcomes to investigate. We may study the importance of multigenerational mobility in social class (Chan & Boliver, 2013), education (Fuchs & Sixt, 2007), poverty (Gans, 2011; Sharkey & Elwert, 2011), earnings (Lindahl et al., 2012), wealth, and other dimensions of socio-economic status. Some of these dimensions – in particular wealth – will likely show much greater multigenerational persistence than others. In addition and following a long tradition of stratification research (Blau & Duncan, 1967), we should also be interested in the relative importance of these different socio-economic characteristics compared to each other as well as changes in their relative weight across generations (see also Jaeger, 2007). Sorokin's (1927) early but no less interesting insight was that the degree to which advantages and disadvantages are transmitted across generations is relatively stable throughout history – at least in the absence of radical social disruptions like those brought about by war – but that the mechanisms through which this transmission occurs may change across time. The mechanisms of inequality transmission should thus necessarily change across generations, too. An assessment of the changing channels of status transmission within family lineages may provide a fruitful new approach to learn how stratification systems evolve.

As a related point, researchers should be keenly aware of the potential for highly non-linear multigenerational effects: As Mare has pointed out, multigenerational associations may be concentrated at the very bottom (e.g. poverty) and the very top (e.g. extreme wealth) of the distribution of advantage. Chan and Boliver (2013) have recently provided some evidence for the concentration of three-generational effects in the "corner cells" of social mobility tables based on data from the United Kingdom. The same type of non-linearity can be illustrated based on data from the United States (see below for an empirical illustration). Also, Hällsten (2014) provides a striking set of findings on the strength of three-generational associations among the wealthiest Swedish households.

2.3. Different analytic and theoretical approaches

Studies of multigenerational mobility – like those included here – may follow the classical approach to assess inequalities in socio-economic outcomes: They analyze how the socio-economic status or any other characteristic of a sample of individuals relates to that of their parents, grandparents, great-grandparents, etc. While this may be the more established approach, it contains its own, considerable challenges: For instance, establishing whether "effects" of grandparents on grandchildren are indeed direct and not mediated by parents requires the analyst to capture all relevant characteristics of parents (without measurement error) that may be impacted by their parents and that may impact the relevant outcome of their children. As we all know, claims about unobserved bias are easily made – but they may be particularly convincing when our analyses include a very limited set of information on the parent generation.

For instance, the empirical illustration I provide below is a far cry from reliably establishing independent three-generational effects. In that example, the independent association between grandparents' (G1) and grandchildren's (G3) higher educational attainment may in fact be mediated by the higher income of parents (G2) that we would predict based on their own (as well as their grandparents') educational attainment. These methodological reasons and others mentioned by Solon (2014) make the unequivocal establishment of three-generational effects an uphill battle – one that several of the contributions included here also struggle with.

A complementary analytic approach is one that seeks to identify multigenerational influences through the analysis of cousin correlations (Hällsten, 2014; Jaeger, 2012; Piraino, 2014). As described below, the attractive feature of this "horizontal" approach is that it estimates the total sum of observable and unobservable sources of three-generational associations and, as such, provides meaningful estimates of inequality in opportunity. This approach, however, also does not establish direct multigenerational "effects" of grandparents since the observed correlations also stem from a range of environmental factors that cousins share through their common ancestry but that lie outside of the grandparental family.

An entirely different analytic approach, however, breaks with the tradition of analyzing social background effects on socio-economic attainment and instead engages in a more direct assessment of the *generational transmission* of inequality. For the three-generational case, this perspective defines a sample of grandparents and asks whether these individuals are successful in passing on their advantage to following generations. This is a very different approach from the one described above, in which the researcher defines a sample of children who are then connected to information on parents and grandchildren. The reason why this conceptual approach may lead to very different findings is that it requires the consideration of demographic processes that may be just as consequential for the distribution of opportunities as the mobility processes described so far (Dribe, Van Bavel, & Campbell, 2012; Duncan, 1966; Hillmert, 2013; Mare, 2011; Mare & Maralani, 2006)). Most importantly, fertility and marital patterns determine whether the advantage held in one generation is still observed in following generations. Clearly, biological reproduction is a necessary pre-condition for the reproduction of advantage. Breen and Lawrence (2013) aptly illustrate how the two different conceptual approaches to mobility – "inequality in opportunity" versus "reproduction of inequality" – lead to a very different understanding of mobility outcomes in the two-generational case. As the number of analyzed generations increases and with them the importance of biological reproduction, we should expect these differences to grow further.

Finally, I would distinguish at least three distinct theoretical perspectives that hypothesize different sets of mechanisms that could account for multigenerational processes and that also imply different empirical approaches: direct transmission, cultural, and structural processes (see also Hertel & Groh-Samberg, 2014). First, grandparents may directly transfer tangible resources (e.g., money, time), intangible resources (e.g., access to social networks, cultural capital), preferences (e.g., time preferences, risk aversion), and genetic material[1] to their grandchildren and following generations.

Coall and Hertwig (2011) provide a review of potential explanations for these transfers but also note that empirical evidence for them is lacking. The measurement of resource transfers is indeed difficult – even for the case of transfers of tangible resources across two generations (but see Schoeni & Ross, 2005). But the role of those transfers may also be assessed indirectly by studying how the strength of multigenerational associations differs by grandparental availability broadly conceived. If direct transfers matter, we would assume that it also matters whether grandparents are deceased or alive, geographically distant or proximate or even co-resident (Kolk, 2014; Zeng & Xie, forthcoming), and whether they are healthy or not (Fomby, 2014). Within this perspective, it is also readily apparent that grandparental effects may be negative, namely when grandparents are net receivers of resources. In industrialized societies, grandparental co-residence may in many cases be due to economic hardship or health issues and thereby contribute to resource dilution that disadvantages grandchildren in the same household (e.g. Kreidl & Hubatková, 2013). Second, multigenerational effects may be at work even in the absence of any active contribution by the grandparents. A helpful discussion of one

[1] The fact that there is genetic transmission is obvious. However, the role of genes in contributing to differences in socio-economic outcomes is small (Fischer et al., 1996; Nisbett, 2009) and interacts with environmental factors (GxE interactions; see also Freese, 2008). Epigenetics, a relatively new strand of research that investigates the role of DNA expression rather than the transmission of DNA itself, may prove particularly relevant for the study of multigenerational outcomes: A ground-breaking series of contributions that detected "trans-generational" effects (the equivalent of non-Markovian processes) of grandparental nutrition on grandchildren's mortality risks (Bygren, Kaati, & Edvinsson, 2001; Pembrey et al., 2005) have been interpreted as evidence of epigenetic transmission and "add a new, multigenerational dimension to the interplay between inheritance and environment in health and development" (Pembrey et al., 2005, p. 165).

type of such "delayed" effects can be found in the contribution by Hertel and Groh-Samberg, where they suggest that grandparents' socio-economic status may shape the reference frame for grandchildren's educational and occupational choices. This multigenerational effect does not necessarily have to be based on direct grandparental influence (e.g., preference transmission): Family histories that are known to individuals may directly alter their own decision-making. Third, structural inequality can maintain multigenerational disadvantage and advantage. Societies that hierarchically order their members along categorical distinctions that restrict access to education and economic success on the one side and sustain "opportunity hoarding" on the other side, create "durable inequality" (Hertel & Groh-Samberg, 2014; Tilly, 1998), or what Wightman and Danziger (2014) call "entrenched stratification processes affecting each [. . .] generation". As sociologists, we should be particularly interested in these processes. However, empirically disentangling them from the other mechanisms mentioned above is difficult. To some extent, they rely on each other: The fact that skin color is passed on across generations (genetic transmission) only becomes relevant in a society that continues to discriminate based on skin color.

3. Data sources and empirical illustration

3.1. Types of data

Gaps in empirical research all too often have to be attributed to a paucity of data. Although the data requirements for multigenerational analyses are indeed substantial, an increasing number of data types and sources are available.

Administrative data derived from population-level registers, such as tax registers or Censuses, can in many respects be a gold mine for multigenerational research. Three of the contributions in this special issue draw on administrative data sources (Hällsten as well as Kolk for Sweden, Piraino et al. for South Africa). In the ideal case, the linking of generations in administrative data is based on unique individual identifiers, such as tax-payer numbers, leading to high data quality (low measurement error and high population coverage), and the linkage of several registers and/or Censuses covers a wide array of information (income, wealth, occupation, education, geography, demographics, and more). Such high-quality data, however, are available for only few countries outside of Scandinavia (but see Lee, Campbell, & Chen, 2010; Mare & Song, 2012 for China). Early successes in linking tax register data from two generations (for the U.S. see Chetty et al., 2014) may be cause for hope that (future generations of) social scientists may eventually draw on multigenerational administrative data for additional countries. In the meantime, researchers have sought intergenerational linkages of historical Census data through probabilistic matching algorithms based on a small number of individual characteristics, such as individuals' names, birth years, and birth locations (Long & Ferrie, 2013). While these matching techniques offer interesting new opportunities for multigenerational research (Long & Ferrie, 2012), they also entail substantial challenges regarding data representativeness (Xie & Killewald, 2013) that future multigenerational research will carefully need to take into account. Even more creative use of historical Census data has recently been made by Clark, Neil, Hao, and Landes (2012), who track the social status content of family names across generations and infer surprisingly low rates of intergenerational mobility and, even more surprising, few differences across centuries and countries.

Long-running longitudinal panel surveys have been the central pillar of much empirical research on two-generational mobility and they have great potential for fulfilling that same role for multigenerational research. Naturally, the determining factor is panel maturity. The Wisconsin Longitudinal Study (WLS, collected since 1957) and the Panel Study of Income Dynamics (PSID, collected since 1968, more information below) constitute the main data sources for the study of multigenerational mobility in the United States. All three contributions in this issue that study the U.S. draw on the PSID (Hertel and Groh-Samberg, Wightman and Danziger, and Fomby et al.). Among several international sister studies of the PSID, the next to reach sufficient maturity for the direct observation of the third generation of panel members are the German Socio-Economic Panel (SOEP, collected since 1984) and the British Household Panel Study (BHPS, collected since 1991). The primary advantage of using these panel surveys for multigenerational research is the breadth of topics they cover: Besides all major socio-economic and demographic variables, they include a range of behavioral measures, attitudes and preferences, personality, health, geographic information, and in some cases even genetic markers – in other words, measures that may directly capture most of the hypothesized mechanisms underlying multigenerational associations. Survey data thus continue to be our best hope to make further inroads into the explanatory study of multigenerational associations. In addition, the following-rules of many household panel surveys are ideally suited to capture

multigenerational family linkages, including for instance multigenerational households in which three generations co-reside. However, in most cases, these same following-rules imply that for the great majority of households only one multigenerational lineage (maternal or paternal) is observed. Panel surveys, of course, also face their own challenges: Although established panel surveys are often rather successful in stemming the general trend of declining survey response rates (at increasing data collection cost), the cumulative nature of non-response across waves inevitably adds up to significant panel attrition. Even a panel survey that was able to maintain a response rate of 99% in each wave (and made no efforts in re-contacting one-time non-respondents) would only observe two-thirds of its initial population after 40 waves ($0.99^{40} = 0.67$). To the extent that non-random patterns on non-response are not fully rectified by statistical weighting, estimates of intergenerational associations can be affected by panel attrition (Schoeni & Wiemers, 2013).

Cross-sectional surveys with retrospective information have also played a large role in studies of intergenerational influences. Surveys on a variety of topics often include basic social background measures as reported by the respondent. However, retrospective data alone are a poor fit for the multigenerational research agenda because the information that can be collected reliably is limited to only selected dimensions of socio-economic standing (i.e. occupation and education) and, more importantly, even for those dimensions the reliability problems in retrospective reports (Bielby, Hauser, & Featherman, 1977; Kreuter, Eckman, Maaz, & Waterman, 2010) are certain to increase massively as respondents are asked to go back further in their family trees. What was your paternal grandmother's highest degree of education? Retrospective data, unlike the two other types of data mentioned above, also restrict multigenerational analyses to one of two possible analytic perspectives: A cross-sectional sample of respondents only allows the analysis of inequality in opportunities for the current generation (say, G-3) but does not provide a representative sample of prior generations (G-1) to study the population-level dynamics of inequality reproduction (Duncan, 1966).

This special issue includes a contribution that successfully draws on a *combination of data types*. Hertel and Groh-Samberg's use of retrospective reports within panel surveys is viable since they restrict their use of retrospective data to occupational information on the immediately prior generation, reducing the measurement challenges mentioned above. Other types of data combinations, not used here, are also attractive and may bring new analytic opportunities. Chiefly, these will be linkages between existing panel surveys and existing "big data". For instance, a beginning project that seeks to link the PSID to earlier Census data (1940 Census) promises to add rich data on education, occupation, income, and wealth for an additional, prior generation. While linkages between panels and historical Censuses will allow us to go backward in time, the future of survey-administrative data linkages likely lies in massive and continuously generated "organic data", such as internet transactions, social media, and consumer data (Groves, 2011). The advantage of anchoring these data with surveys (and thereby taming "big data" into a much smaller sample) lies in the complementary information that these types of data may provide, in an opportunity for assessing the (non-)representativeness of organic data, and not the least in the practical issue of attaining individual consent for data linkages where necessary. Enriching data on current generations expands the range of outcomes for multigenerational research and paves the way for future studies in which current generation G_t has grown up to become G_{t+1}.

3.2. The Panel Study of Income Dynamics

As the world's longest-running nationally representative household panel study, the Panel Study of Income Dynamics (PSID) is poised to become one of the primary data sources to sustain a broad multigenerational research agenda. Administered annually between 1968 and 1997 and biannually since then, the PSID has so far collected 38 waves spanning 45 years. The initial PSID survey was administered to 4802 households with 18,230 individuals. In addition to the nationally representative sample, the PSID also oversampled low-income households ($N = 1872$). Although about half of the latter households and their offspring were not further followed after 1997, this oversample still facilitates analyses of intergenerational associations at the bottom of the socio-economic hierarchy. An immigrant refresher sample was added in 1997.

The PSID applies a genealogical design in following its original sample households as well as their offspring. The concept of a "PSID gene" – a marker of eligibility for the PSID survey that is passed on from generation to generation – lends itself ideally to the analysis of inter- and multigenerational associations. Throughout its existence, the PSID has maintained exceptionally high wave-to-wave response rates (>96% in almost every wave). In 2011, the PSID survey was administered to 8907 families with 24,661 individuals. Of those, 16,712

individuals belong to the third generation of survey members and 6482 to even higher generations.[2]

The most detailed information in the PSID is collected for household heads and their spouses/partners. Therefore, the full PSID information on third generation individuals is available only for those who have already established their own, independent households (i.e. they do not live with their parents anymore nor do they live in an institution, such as a college dormitory). In 2011, 6113 of third-generation survey members are current heads and spouses/partners, which corresponds to 60% of all current household heads and spouses/partners observed in the 2011 wave. To collect additional information on children and young adults before they form their own households, the PSID began collecting data on a cohort of PSID children aged 0–12 in 1997 in the Child Development Supplement (CDS; $N = 3563$). This cohort of children has been re-interviewed in 2002 and 2007 (CDS-I & CDS-II) and, as they turned 18 or left high school, they have been administrated the Transition into Adulthood Survey (TA) in 2005, 2007, 2009, 2011, 2013, and one last time in 2015 (expected $N \approx 2400$). The current CDS/TA sample has supported several multigenerational contributions, such as those by Wightman and Danziger (2014), Fomby (2014), Davis, McGonagle, Schoeni, and Stafford (2008), Roksa and Potter (2011), Sastry (2012), Yeung, Persell, and Reilly (2012), and Valerio, Andreski, Schoeni, and McGonagle (2010). Future multigenerational research will additionally also be able to draw on a new CDS that collects information on PSID children aged 0–17 in 2014 (expected $N \approx 6000$).

3.3. Illustration of non-linear multigenerational associations in the United States

To illustrate PSID's general attractiveness for multigenerational research, I include a brief analysis of three-generational educational mobility (for related and broader assessments of three-generational social mobility based on the PSID see also Pfeffer, 2014; Song, 2014). For the purpose of this article, I do not document the plethora of decisions and assumptions that go into the construction of intergenerational samples – and even more so multigenerational samples – but I note that this necessary information is described in appreciable detail in each of the contributions included here. Nevertheless, the critical reader should always consider the impact of a range of analyst decisions, starting with the basic question of whether researchers rely on contemporaneous measure for multiple generations (common wave for all generations) or sequential measures (e.g. common age for all generations). Or whether the analyst disregards the timing of measurement altogether, such as in the example reported below.

Here, I draw on three generations of respondents (above 30 years of age; $N = 2079$) and assess the relationship between their highest educational degree ever reported in any wave (less than high school, high school, some college, and a bachelor's degree or more). The resulting three-way cross-classification of educational attainment is analyzed through log-linear and log-multiplicative models. The saturated model

$$f_{ijk} = \beta_i^G \beta_j^P \beta_k^C \beta_{ij}^{GP} \beta_{jk}^{PC} \beta_{ik}^{GC} \beta_{ijk}^{GPC} [f = GPC] \qquad (1)$$

describes associations between the educational attainment of the child (C), the highest educational degree among its parents (P), and among its grandparents (G). Table 1 reports fit statistics for a range of substantively interesting non-saturated models. For instance, the comparison of model (1) and (2) tests whether there is an association between grandparental educational status and child's educational status that is not fully mediated by parental educational status. Further models reported in Table test the specific shape of this three-generational association (see Chan & Boliver, 2013 for details). All of them provide a statistically significant improvement in model fit over a model that assumes no three-generational associations (right-most column). A model that is highly parsimonious while still providing an acceptable fit (therefore also being the preferred model judging by BIC) is model (5). It restricts the three-generational associations to occur only in the two "corners" of the three-generational mobility table, i.e. the association between grandparental and grandchild's high school drop-out status as well as post-secondary educational attainment. In line with the results reported by Chan and Boliver for occupational mobility in the United Kingdom, this evidence suggests that multigenerational associations in educational status in the United States are concentrated at the extremes rather than the middle of the socio-economic distribution.

4. Contributions to this issue

In the remainder, I provide a brief overview of each contribution to this special issue. Following a theoretical

[2] The PSID offers a Family Identification Mapping System (FIMS, http://simba.isr.umich.edu/FIMS/) that facilitates the creation of intra-, inter-, and multi-generational samples as well as tutorials and webinars that explain its use.

Table 1
Log-linear models of three-generational educational mobility.

	G2	df	*p*	Δ	BIC	*p* vs (1)
Mainmodels						
(1) Markovian [GP,PC]	43.0	36	0.195	3.8%	−232	
(2) 3-Gen [GP,PC,GC]	25.0	27	0.572	2.9%	−181	0.035
3 − *Gen* : *topological*						
(3) Quasi indep.	28.5	32	0.647	3.0%	−216	0.006
(4) Main diagonal	38.2	35	0.326	3.6%	−229	0.028
(5) Corners only	30.2	35	0.701	3.4%	−237	0.000
3 − *Gen* : *scaled*						
(6) UnifAssoc.	43.0	35	0.165	3.8%	−224	
(7) UniDiff(G)	20.6	24	0.664	2.7%	−163	0.032

treatment of intergenerational mobility (Solon), the first three analyses report multigenerational associations in socio-economic outcomes, focusing on education and occupation (Hällsten), social class (Hertel and Groh-Samberg), and income (Wightman and Danziger). The next three contributions turn their attention to multigenerational associations involving demographic outcomes, namely fertility (Kolk, Fomby et al.) and mortality (Piraino et al.). Together, these contributions thus lie at an interesting intersection between socio-economic mobility and demographic processes and should provide ample motivation for future research that fully engages in the *joint* analysis of socio-economic and demographic reproduction, a theme that also features centrally in the commentary to this special issue (Mare).

Gary Solon takes on the task of describing and updating the Becker–Tomes model, the theoretical model of intergenerational mobility that builds the cornerstone of mobility research in economics. The status of this model in the economics literature is hard to overestimate and arguably surpasses that of the work by Blau and Duncan (Blau & Duncan, 1967), which has served to orient much sociological stratification research. Those not familiar with Solon's earlier contribution along these lines (Solon, 2004) and particularly those interested in contributing across disciplinary lines (Morgan et al., 2006) will greatly profit from the first part of his contribution, where he provides an introduction to the Becker–Tomes model that is also digestible for non-economists. He not only emphasizes that the Becker–Tomes model predicts small negative grandparental effects but also gives this predication an intuitive interpretation: "If the parent did not earn more despite the advantages of higher grandparental income, this signals that the parent got a poor draw on her or his genetic/cultural endowment, and that poor draw tends to be passed on to some extent to the child" (p. 15). The sociological reflex to question the heroic assumptions of theoretical models like the one presented here should be held back until the second part of this contribution, which develops the model further. The reader also should not be mislead by Solon's understatement of his own contribution: He extends the Becker–Tomes model in important ways by incorporating two of the theoretical mechanisms of multigenerational transmission mentioned earlier – direct transmission and structural inequality – into the model. As a result, he brings the model into congruence again with the emerging literature reporting positive grandparental effects. Finally, Solon also describes a major methodological challenge by showing that measurement error may upwardly bias multigenerational effect estimates.

Martin Hällsten's contribution is a convincing application of a horizontal perspective on multigenerational mobility: He analyzes cousin correlations for a range of socio-economic outcomes based on Swedish register data. Much like correlations between siblings that are driven by environments shared by brothers and sisters – most importantly their parents – correlations between cousins derive from shared environments further back – most importantly including their shared grandparents. As Hällsten mentions, these estimates do not distinguish between different types of observable and unobservable sources of intergenerational mobility and immobility, but importantly they reflect the sum of them. As such their size is quite large. Hällsten presents cousin correlations in GPA, cognitive ability, years of education, and occupational prestige that lie between.19 and.11. The size of these correlations is particularly remarkable when we take into consideration that the presented numbers likely are lower-bound estimates (for technical reasons described by Hällsten, such as the down-weighting of larger families and the averaging across lineages) and

that they stem from a nation marked by exceptionally high levels of egalitarian commitment and reform efforts by historical and comparative standards. The perhaps most striking finding comes from an assessment of heterogeneity in cousin correlations across the wealth distribution: The cousin correlations among descendants from the wealthiest grandparents are about as high as the corresponding sibling correlations in the general population. In other words, the wealthiest Swedish families are able to hand down their advantage to the third generation at least as effectively as the average Swedish family transmits its status to the immediately adjacent second generation. These main results as well as additional findings – such as evidence for four-generational effects based on second-cousin correlations, evidence that does not support a Markovian model of social mobility, and indirect evidence for the important role of differential fertility in mobility processes – make this contribution a baseline that future research will have to measure up against.

Florian Hertel and Olaf Groh-Samberg provide to my knowledge the first-ever direct cross-national comparison of multigenerational mobility. They assess patterns and rates of social class mobility among men in the United States (using the Panel Study of Income Dynamics) and Germany (using the German Socio-Economic Panel). Based on their review of a sizeable amount of existing multigenerational work from other countries and their own theoretical considerations they expect to find notable differences between these two countries. Instead, their analyses yield an overall picture of cross-national similarity in the degree of multigenerational class mobility. The notion of exceptionally high social mobility in the United States thus appears to be a myth for not only the two-generational but also the three-generational case. Hertel and Groh-Samberg's contribution also provides another clear theoretical treatment of the potential mechanisms underlying multigenerational mobility processes – although comparative analyses can necessarily only provide indirect evidence in favor or against these hypothesized mechanisms. Further important findings of their contribution include significant three-generational associations in class status (independent of parental class) that are most notable for the reproduction at the top of the class structure (the service class) in both countries. Similarly, class reproduction at the bottom (the unskilled working class) also appears strong – and stronger in the U.S. where it is likely driven by multi-generational disadvantage among African-Americans. They interpret the latter finding as suggestive evidence for categorical inequality (Tilly, 1998).

Patrick Wightman and Sheldon Danziger investigate the determinants of educational attainment from a multigenerational perspective drawing on data from the Panel Study of Income Dynamics and its Transition into Adulthood Survey. They find a substantial association between grandparental income and children's probability of high school attainment (conditional on parental income and a host of other controls) but no such three-generational association for college entry. Wightman and Danziger also attempt to uncover some of the mechanisms that may drive multigenerational associations and consider the mediating role of parental educational expectations, children's home environment and their cognitive and non-cognitive abilities. Those latter analyses are framed differently than the remaining contributions to this special issue: In many ways, Wightman and Danziger's use of grandparental information is geared at revealing something more about parents. In particular, they are interested in parents' own intergenerational mobility experiences and their impact on the next generation. Although the conceptual case for such "mobility effects" is clear and intuitive, there are significant methodological challenges to empirically disentangle mobility from status effects in the two-generational paradigm (Sobel, 1981, 1985) that extend to the three-generational case. While these challenges also apply to the analyses presented in this contribution, the breath of different mediating processes covered will make it an intriguing starting point for further research on the social mechanisms behind multigenerational associations.

Paula Fomby, Patrick M. Krueger, and Nicole M. Wagner take a detailed look at the multigenerational significance of fertility patterns in the United States. Drawing on the PSID-CDS sample, they investigate whether children's cognitive outcomes are associated with their grandparents' fertility timing. Motivated by the fact that high life expectancy and low fertility have led to increased availability of grandparents for grandchildren, they hypothesize that age differences among these grandparents are consequential for grandchildren. Fomby and her co-authors do indeed detect a stable – although overall small – positive association between grandparental age (at birth of their own children) and their grandchildren's verbal ability. In this sense, delayed fertility appears to be beneficial to not just the next but the next two generations, independent of other demographic and socio-economic characteristics. Interestingly, this multigenerational association does not extend to the math ability of children. The authors' interpretation of this discrepancy is that grandparents may more easily take an active role in fostering the verbal ability of their grandchildren than their math ability.

To over-simplify, direct interaction with grandparents (and more of it with older grandparents) may benefit grandchildren's language development (see also Hart & Risely, 1995). Of course, it would be interesting to test this explanation directly if indicators for the frequency of interaction between grandparents and grandchildren were available. Finally, since Fomby et al. include a range of other demographic and socio-economic characteristics of grandparents as controls in their models, the documented associations between these and children's cognitive outcomes may be of independent interest to some readers. In many cases these associations appear to be fully mediated by parental characteristics (Markovian mobility), however, the authors also acknowledge that their estimates may be attenuated by the specific measurement strategy applied here (time-concurrent measurement of grandparental and parental characteristics).

Martin Kolk puts the impressive collection of Swedish administrative data to further good use. In his analysis of the multigenerational transmission of fertility outcomes, he shows independent – although relatively modest – associations between the fertility outcomes of grandparents and their grandchildren (independent of parental fertility). His finding that a large part of these associations is unrelated to the intergenerational transmission of (a limited set of) socio-economic outcomes shows that demographic processes are partly independent of mobility processes and should provide further motivation for the joint consideration of these two dimensions of intergenerational transmission discussed above. The topic studied here provides another opportunity to illustrate the fundamental difference in the two analytic approaches described earlier: Kolk assesses fertility outcomes in the grandchild generation (G3) to determine the effects of fertility outcomes of earlier generations. Of course, there is a possible fertility outcome in earlier generations that is not captured in this perspective, namely non-fertility. To be sure, the fact that the unborn are not part of Kolk's analysis – and in fact, of any of the analyses presented in this special issue – is a necessary consequence of the analytic perspective taken, not a reflection of a modeling decision. Nevertheless, other researchers may alternatively be interested in the population-level dynamics of reproduction. They would study a sample of G1 individuals that also includes individuals who never have children. How the results of these two approaches compare with each other – and even how they speak to each other – is worthy of future investigation.

Over two hundred years worth of genealogical records on European settlers in the South African Cape Colony are the basis for the contribution by *Patrizio Piraino, Sean Muller, Jeanne Colliers, and Johan Fourie*. They analyze the transmission of longevity as an important health outcome across up to four generations. Notably, Piraino and his coauthors use two methodological approaches to document multigenerational associations, that is, a regression approach to estimate conditional associations between generations (vertical perspective, see Solon and all other contributions in this issue) and correlations among siblings, cousins, and second cousins (horizontal perspective, see Hällsten, 2014). This dual approach in the end allows them to detect important multigenerational determinants of longevity despite a lack of evidence for a direct effect of grandparental and great-grandparental longevity. They find a correlation in longevity among cousins (and even second cousins, i.e. the fourth generation) that is of practical significance, in fact even of similar order of magnitude as the sibling correlations in their sample. Their lucid interpretation of this evidence is that the correlation in cousins' longevity points to the importance of common grandparental conditions (including socio-economic and environmental conditions) but that "the longevity of their grandfather is of minor importance in explaining their resemblance" (p. 115). Piraino et al. also comment on the debate on the role of genetic transmission, which seems to be similarly contested for the study of longevity as it is for the study of socio-economic outcomes. It is noteworthy that the intergenerational associations in longevity documented here are generally smaller than those in socio-economic status and that even this relatively small association is, in the view of the authors, likely to arise to a sizeable part from non-genetic factors. In other words, even for a an outcome for which I suspect many are willing to assume a more pronounced role of genetic transmission, the empirical evidence stands against a view of biological determinism.

Robert Mare provides a commentary to this special issue. Besides arguing for the multigenerational study of demographic outcomes in its own right, he also presents a baseline model of multigenerational mobility that jointly estimates the effects of intergenerational status transmission and fertility differentials (as well as, in more complex versions of the model, mortality and marriage patterns). Mare and Song have begun to demonstrate the potential of this model in a series of articles and it may well become the cornerstone of future multigenerational research. Mare goes on to note a range of further research topics of interest, including increased attention to the size of generational gaps flowing from differences in fertility timing, the potentially diminished role of education for the persistence of inequality at the very extremes of the socio-economic distribution, and the empirical

identification of multigenerational mechanisms as they fall into the broad and interlinked categories of endowments and investments. For all of these, researchers will be served well by a pluralism of data sources. Finally, Mare's commentary reminds us that multigenerational research – much like other areas of social research – should not dismiss descriptive evidence, in particular if it corresponds to sensible a priori hypotheses, in favor of an exclusive focus on causal inference. In the case of multigenerational associations, unreflective concerns about upward bias may be particularly harmful.

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