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Family size as a social leveller for children in the second demographic transition

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Abstract

Steep socio-economic gradients in family size were a major source of disparities for children in the early 20th century and prompted much social research and public commentary. By the 1960s, a scholarly consensus was emerging that SES differentials in women's fertility in western countries were tending to narrow but developments since then have received limited attention and a children's perspective relating to the distinct question of sibling numbers (or 'sibsize') has been lacking. Drawing mainly on data from the United States but with some comparative information for other western countries, this paper finds that a sharp reduction in social disparities in sibsize occurred in the final third of the twentieth century and acted as an important (though in the US case, incomplete) social leveller for children. This development is significant as a counter to other aspects of socio-demographic change in the same period which have been found to widen social inequalities for children. A key implication is that until we pay closer attention to sibsize patterns, our picture of how socio-demographic change has affected social inequalities among children in recent decades may be both incomplete and unduly negative.

Keywords: Children, Family, Social inequality, Social stratification

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Introduction

The family is recognised in the social sciences as a primary influence on children's lives. It is also widely recognised that differences between families in how this influence operates are structured by socio-economic status (SES), as defined by factors such as parental occupational class, educational level, household income or some combination of these. The basic pattern is that SES differences in the material, social or cultural resources available to families cause family behaviours which affect children's life chances to be socially differentiated and to shape the transmission of SES from one generation to the next. These processes have attracted the interest of social scientists since the social stratification of family contexts is recognised as an important dimension of overall social inequality, while its contribution to the reproduction of social inequalities across generations is a core influence on social mobility (from a large literature, see e.g. Boudon 1974, Erikson and Goldthorpe 1992, Duncan and Brooks-Gunn 1997, Breen and Jonsson 2005, McLanahan and Percheski 2008)

The purpose of this paper is to explore SES differences in socio-demographic aspects of children's family contexts in the course of the second demographic transition (SDT), that institutional and behavioural loosening of family life that occurred in the western world since the 1960s, following hard on heels of the fall in mortality and fertility that constituted the first demographic transition of the early industrial era (Lesthaeghe 2010). Standard accounts point to forms of family instability that increased in the SDT such as child-bearing outside marriage, unstable cohabitation, marital breakdown and serial union formation as key factors. These factors are usually thought to reduce the quality or quantity of parental resources such as time and attention, income or parental human capital that are available to children. Shortfalls in such resources arising from family instability have been found to be concentrated among lower social class families and to act as an important aspect of modern social stratification, particularly as it affects children (McLanahan and Percheski 2008, Western, Bloome and Percheski 2008, Chapple 2009). While researchers have noted differences between countries in how strongly these processes operate and which aspects of family instability are most influential (Kiernan et al. 2011, Kennedy and Thomson 2010, Perelli-Harris et al. 2010), the general conclusion in current research is that the effect of the SDT is either to widen

or sustain inequalities between children, never to narrow them (McLanahan 2004, McLanahan and Percheski 2008, Perelli-Harris et al. 2010, Bonke and Esping-Andersen 2011). Some aspects of fertility are included in these analyses but these are limited to features such as the timing and partnership circumstances of births. These features too are generally found either to increase or perpetuate the relative disadvantage of lower SES children, in that those children are more likely to start life in less favourable family circumstances – for example, by being born to young solo mothers or to couples in unstable cohabitation (Perelli-Harris et al. 2010, Sawhill 2006).

The import of these lines of thinking, then, is that at a minimum the SDT is not a force for equality in children's lives and may in fact generally tend to increase disparities. Sara McLanahan well represented this view in her Presidential Address to the Population Association of America in 2004 when she asserted that in the United States and other western countries the 'second demographic transition is widening social disparities in children's resources' and is creating 'diverging destinies' for children (McLanahan 2004: 608). In her account, the SDT works in conjunction with other factors such as differences in women's access to well-paid jobs to play this role. The result is weak couple relationships, especially unstable cohabitation, and what she terms 'fragile families', a family type which, in her view, is increasingly dominant in lower SES groups and helps to perpetuate or widen social inequalities between children from lower and higher SES backgrounds (see also Sawhill 2006, McLanahan and Percheski 2008, Waldfogel, Craigie and Brooks-Gunn 2010, Carlson and England 2011).

Here we draw attention to a socio-demographic trend in the SDT that needs to be included in these lines of thinking and may have more positive implications for social inequalities between children, namely, a narrowing of SES differentials in family size, particularly in what we define below as *children's* family size (also often referred to as sibsize). The issue here is that family effects on children depend not only on the resources parents can devote to their upbringing but also on the number of siblings among whom those resources must be shared. In the (first) demographic transition, a widening of social class differentials in women's family size was identified by contemporaries as a key feature of social change and a major contributor to social inequalities (Glass 1976, Haines 1979, Szreter 1996, Dribe, Oris

and Pozzi 2014b, Soloway 1990). Around the mid-2oth century, scholars came to the conclusion that this widening trend was reversed in most western countries and ushered in a new era of narrowing SES differentials in women's completed fertility, partly driven by an upsurge in childbearing among higher social class women during the post-war baby boom (Johnson 1960, Kiser 1960, Kiser, Grabill and Campbell 1968, Glass 1968, 1976). As the baby boom petered out and new lows in fertility arrived in the post-1960s era, cross-country trends in fertility differentials become quite varied, although details on these trends also became limited since data sources and research on this topic tended to wane (Kravdal and Rindfuss 2008: 869). A complete flattening of the SES differentials in fertility has been identified in some countries in Northern Europe (Kravdal and Rindfuss 2008, Andersson et al. 2007, De Wachter and Neels 2011), there is some evidence of widening in the UK (Sigle-Rushton 2008) while the newly low but still substantial differentials that had emerged in the US by the 1960s seemed to persist for some decades (Sweet and Rindfuss 1983, Jones and Tertilt 2006).

Against this background, there are several reasons for examining how social inequalities in children's family size have evolved in recent decades. First is the need to update an important but now little investigated aspect of social inequalities in children's family contexts. There is a great deal of continuing research on the impact of sibling numbers on children's development (for a review, see Steelman et al. 2002; recent contributions include Black et al. 2005, 2007, Booth and McKee 2009, Kristensen and Berkdahl 2007, 2010, Härkönen 2014). However, this research has not examined changing levels or distribution of sibsize over time nor has it sought to draw out the implication of its findings for long-term trends in social inequalities between children. This is a gap in knowledge which deserves some attention.

Second is the need to examine family size from a children's rather than an adult point of view, in a context where the standard view of family size is usually based on analysis of women's fertility outcomes. The difference between these perspectives was first set out by Samuel Preston forty years ago (Preston 1976; more recently, see Shkolnikov 2007, Lam and Marteleto 2008, 2013). A simple example Preston used to illustrate what is involved is that if half of a group of women have no children and half have four, the mean family size for the women is two but the mean sibsize for their children is four (Preston 1976: 105). Levels of childlessness and

skewness of parity distributions among women affect women's family size and children's sibsize differently and mean that one cannot automatically read off children's sibling numbers from looking at women's fertility outcomes (see also Lam and Marteleto 2013). These factors also mean that we cannot rely on trends in women's fertility differentials as a direct guide to corresponding trends in children's sibsize. In consequence, the narrowing of women's fertility differentials in the post-war era outlined earlier may overstate, understate or otherwise misrepresent what happened with differentials in children's sibsize in the same period. Thus we need to examine trends and differentials in children's sibsize directly.

A final reason for taking up this issue is the growing availability of data which enable it to be studied. Traditional demographic investigation of family size used data on the fertility behaviour of age cohorts of the adult population, a topic that is now less extensively covered in data collection than it used to be (Kravdal and Rindfuss: 869). However, as Lam and Marteleto (2013: 20-22) point out, the study of children's sibsize is more appropriately based on age-cohorts of children. Relevant data sources on children containing either direct or derived information on sibling numbers are now available for a number of countries in comparable form, of which we draw on data for four countries here – the United States, the UK, Denmark and Ireland. The US data are of exceptional interest in that, because of large public-use samples from census and Current Population Survey sources dating from 1900 to the present where information on family size was collected, it is possible to extract a time-series of samples of children containing sibsize and related details to cover the twentieth and early twenty-first centuries. Because of the unique richness and consistency of the data available from these sources, our main focus in the present paper is on the United States. (There is also the consideration that, as indicated earlier, concern about disequalising tendencies in children's family contexts during the SDT have been voiced especially in the United States, thus highlighting the interest of a possible equalising counter-trend arising from movements in children's sibsize over the same period.) In addition to the analysis of trend data from these US sources, we also use the 2012 CPS to place the current American situation in some comparative context, drawing on child-focused data for the UK (the Millennium Cohort Study), Denmark (the Danish Longitudinal Study of Children) and Ireland (Census 2011) for that purpose.

Content and structure of paper

The overall purpose of this paper, then, is to bring family size back in to the analysis of social inequalities in children's family contexts and to do so particularly through a children's perspective on this issue. The aim is to provide a broad overview of the topic on the basis that an outline of general trends and their historical background is a useful prelude to more detailed analysis of particular aspects that might be taken up in later research. To that end, the next section of the paper sets the scene by sketching what is known of the evolution of family size differentials in western countries since the late nineteenth century, as understood from a conventional adult perspective. Following Preston (1976) and Lam and Marteleto (2013), that is followed by a child-focused account of the same question, utilising US data on children's sibsize from 1900 to 2012. This account highlights both the long-term decline in sibsize but also the surprisingly high level at which sibsize has bottomed out in at least some western countries, including the US, in recent decades. That brings us to the core topic of the paper, which examines the trend in SES differentials in children's sibsize. Here again, we rely on US data, focusing on time series samples of children aged 8 and 9 years from 1940 to 2012 (the start date of 1940 is chosen because the proxy indicator for SES that we use – the educational level of mothers – is available in the US data only from that date). The results of that analysis show a mix of widening and stasis in sibsize differences between children of the least educated and most educated mothers in the immediate post-war period followed by a sharp narrowing between the 1970s and 1990s. Since the latter was a period when the destabilising effects of the SDT on the American family were in full flow, the reduction in sibsize inequalities amounted to a positive development for lower SES children in the US at a time when other aspects of family change seemed to be working to their disadvantage. We then briefly compare current differentials in children's sibsize in the US with those in the UK, Denmark and Ireland. A final section summarises and concludes.

Historical background

In his *Essay on the Principle of Population* (1798), Thomas Malthus pointed to prolific childbearing among the poor as a permanent feature of the human condition, though the historical record indicates that the largest families were

sometimes found among the better off (Skirbekk 2008, Dribe et al. 2014b). For Malthus, however, the concern was that among the mass of the population in the world as he knew it the relationship between family size and household resources never escaped a precarious balance and kept the poor perpetually on (or sometimes below) the brink of destitution (for a brief account, see McNicoll 1998). Historically, some restraint on fertility had been exercised in western Europe by the deferral or complete avoidance of marriage, so that nuptiality patterns were the proximate determinants of fertility, and early marriage among the poor was a common driver of their large families (Livi-Bacci 2000: 99 –107). By the late nineteenth century, however, a new era had dawned as the practice of limiting child-bearing within marriage – fertility 'stopping behaviour' – became widespread and even couples who married early in life increasingly ended up with few children (Coale and Treadway 1986).

Thus arrived the fertility strand of the (first) demographic transition and a break in the tight historical link between family size and marriage patterns, a break that was well established and almost universal among western countries by the early twentieth century. However, the new behaviour spread unevenly within societies: the upper and middle classes adopted fertility limitation within marriage and embraced small family norms quite quickly while the same occurred more slowly among the lower classes. In consequence, as the transition to low fertility took off and marital fertility fell, patterns of differential family size became more pronounced and emerged as an important contemporary social issue.

The seminal empirical study of this topic was that published by T.H.C. Stevenson in 1920 based on fertility data from the 1911 census of England and Wales (Stevenson 1920; see also the official *Fertility of Marriage* report of which he was the main author – Census of England and Wales 1911 (1923)). Stevenson showed that, against a background of an overall steep fall in family size, social class differentials in married women's completed fertility had widened dramatically since the mid-nineteenth century. Using fertility data standardised for marriage duration, he found that among women who married in 1851-60, upper and middle class fertility was 11 per cent below the national mean while unskilled working class fertility was 3 per cent above it (a 14 percentage point spread from the top to the bottom of this social class range). Looking at the same indicator for women who

married in 1891-96, upper and middle class fertility had dropped to 26 per cent below the national mean while unskilled working class fertility had risen to 13 per cent above it, giving a total spread of 39 percentage points (Stevenson 1920: 416-7). By this measure, then, the cross-class spread of completed fertility had widened almost three-fold in forty years. This finding confirmed what many contemporary commentators had long suspected, namely that, as Stevenson put it, the 'more successful and prosperous classes were behindhand in their contribution to the upkeep of the nation' (Stevenson 1920: 417).

Stevenson's study was a landmark in a rising spate of research and commentary on fertility differentials in a range of countries (the numerous studies cited in Pearl 1927 give an indication the amount of work on the topic; for other examples in English, see Ogburn and Tibbetts 1929, Edin and Hutchinson 1935, Methorst 1935, Notestein 1936, Innes 1938, Westoff 1954; for more recent work on the subject, see Haines 1979, Szreter 1996, Barnes and Guinnane 2012, Dribe et al. 2014a, 2014b). These studies pointed to a characteristic demographic double-bind of the inter-war years: overall fertility was low and threatened population size while social gradients in family size had become steep and were widely viewed as a threat to population quality. The question of population quality arose in part because large families among the poor aggravated their poverty and hampered children's development (a core concern of the early classic studies of poverty in Britain – Piachaud and Webb 2004: 49-50). In addition, there was widespread eugenic alarm that the poor and 'unfit' were contributing disproportionately to population replacement, thereby causing population quality to 'degenerate' (from the large literature on eugenics and the fears of population degeneration caused by social gradients in fertility in this period, see Kevles 1985, Soloway 1990, Ramsden 2003, Broberg and Roll Hansen 2005).

The post-war baby boom reversed the trend of falling fertility and widening of fertility differentials and set in train a long-term movement towards greater social equality in women's completed family size (though as we will see below, trends in children's sibsize proved to be a different matter). By the 1960s, researchers were reporting that SES differentials in women's cohort fertility had narrowed, partly because of a rise in fertility among higher class women in the post-war baby boom (Johnson 1960, Viser 1960, Viser et al. 1968). In the United States, for example, a

detailed analysis of the period 1940 to 1960 showed a substantial contraction in fertility differentials by women's level of education (Viser et al. 1968: 147-178). To take the case of native-born white women aged 45-49 as an illustration, in 1940 those with elementary education had a mean of 3.13 children while college graduates had 1.23, a ratio between the least educated and best educated of 2.54 to one. By 1960, completed fertility had fallen to 2.71 among those with elementary education and had risen to 1.52 among college graduates, thus compressing the ratio to 1.78 to one (Viser et al. 1968: 156). In a review of the field in 1976, D.V. Glass concluded that a similar narrowing of socio-economic differentials in women's fertility was common to many western countries and that modern contraceptive practice had become more evenly distributed by social class (Glass 1976: 9-12; also Glass 1968).

By the end of the twentieth century, such was the declining salience of differential cohort fertility as a social issue, it had ceased to be a major focus of research and fertility was dropped from census measurement in many countries (Kravdal and Rindfuss 2008: 869). From the limited information available, as referred to earlier, studies showed a mixed pattern of differentials, ranging from minimal levels (as in the Nordic countries – Andersson et al. 2007) or even a positive association between SES and completed fertility (Kravdal and Rindfuss 2008, De Wachter and Neels 2011) to continuing or even slightly widening differentials in England and Wales (Sigle-Rushton 2008) and the United States (Sweet and Rindfuss 1983, Jones and Tertilt 2006)

As the compression in women's completed fertility outcomes was underway, research on social inequalities in children's family contexts shifted focus and became pre-occupied with the new trends in family instability which emerged in western countries from the 1960s onwards – what has since come to be called the second demographic transition (Lesthaeghe 2010). The main initial concerns from a children's perspective were a surge in divorce across many countries (Goode 1993, Härkönen and Dronkers 2006) and a steady rise in the share of births taking place outside marriage (Sawhill 2006, Chapple 2009). It soon emerged that the latter trend was largely accounted for in most countries by a growth of child-bearing among cohabiting couples and that cohabitation was not simply marriage without the legal formalities but was a less stable form of union with a greater risk of

breakup (McLanahan and Percheski 2008, Furstenberg 2011, Carlson and England 2011). Even in Nordic countries where cohabitation was more common and socially accepted than elsewhere, it was less stable than marriage and was negatively linked to SES (Kennedy and Thomson 2010). Similar linkages were generally found around Europe (Perelli-Harris et al. 2010). In the US, rising partnership instability was accompanied by a growth in serial unions, entailing multiple transitions in parental arrangements for many children, with similar patterns occurring to some extent in Europe and elsewhere (Cherlin 2003, Thomson et al. 2014).

By the closing decades of the twentieth century, then, scholars had come to accord to family instability a role in the social stratification of children's family contexts that family size had played in the early decades of the twentieth century. This view emerged most strongly in the United States where virtually all forms of instability (including serial union formation) were strongly differentiated by SES but milder versions of the same syndrome were generally thought to be common in Europe (see, e.g., Perelli-Harris et al. 2010, Kennedy and Thomson 2010, Härkönen 2012).

The child's perspective on family size

Trends in family size outlined in the previous section capture an important aspect of modern family history but because they look at this question from an adult perspective they can be misleading about the implications for children. Preston (1976) showed that family size among cohorts of women and sibsize among their children can differ widely and under certain conditions can move in opposite directions over time. Through simple mathematical analysis, he demonstrated that the difference between the two is a function of the level of variance in women's family size – the more uneven the distribution of women's parity, the greater the gap between women's cohort fertility and the mean sibsize of their children. His formula for calculating the mean sibsize of children based on fertility data for a cohort of women is

$$\overline{C} = \sum f(X) \cdot X^2 / \overline{X},$$

where $\overline{C}$ is the mean sibsize among the children of a cohort of women, $f(X)$ is the proportion of women in the cohort who have family size of X children, and $\overline{X}$ is the women's mean family size. Algebraically, this transforms to

$$\overline{C} = \overline{X}\,(1 + V_X^2)$$

where V_X is the coefficient of variation in women's family size (i.e. the standard deviation as a ratio of the mean). This equation means that children's sibsize always exceeds women's family size except where all women have exactly the same number of children and none are childless (that is, where V_X^2 is zero). As the variance in women's family size rises, the multiplier represented by $1 + V_X^2$ increases and the gap between women's and children's family size widens.

Preston pointed to what in modern conditions is an important property of this relationship, namely, that if women in a cohort were transformed from being childless into mothers with one child, the mean family size of the cohort of women would rise (since there would be fewer zero values in the calculation of the mean) but the mean sibsize of their children would fall (since fewer zero values would lower the variance in women's family size and narrow the gap between women's and children's mean family size). The corollary is that if in successive cohorts, women with small families were replaced by women who remained childless, women's family size would fall and children's sibsize would rise. *Thus movements in either direction between childlessness and small family size among women are a key circumstance where women's fertility and their children's sibsize can change in opposite directions.* Since such movements are common in the history of women's fertility in western countries in the past century, these properties reveal why patterns of women's fertility are unreliable as direct guides to trends over time or differences between social groups in children's sibsize.

To illustrate what these differences amount to in practice, Table 1 presents data on mean family size and distributions by family size for a cohort of women whose fertility was recently completed in eight western societies and compares them with the same indicators computed for those women's children (these cohorts of women were born in the early 1960s or late 1950s and thus reached completed fertility around the early to mid 2000s). Children's mean sibsize is surprisingly large in many countries and in all countries is substantially greater than women's mean cohort fertility. In the US, for example, women's mean family size is just under two (1.98) but the mean sibsize of their children is close to three (2.88) and 26 per cent of the children have a sibsize of four or more. Furthermore, if we compare the United States and the Czech Republic, women's mean family size is almost identical

(1.98 and 1.99 respectively), but there is a substantial gap in children's sibsize (2.88 in the US versus 2.45 in the Czech Republic, with only 11 per cent of Czech children having a sibsize of four or more). The reason for this divergence is the wider variance in women's family size is the US: 16 per cent of US women had no children and 11 per cent had four or more, compared to corresponding percentages of 7 and 5 per cent in the Czech Republic.

Table 1. Women's and children's mean family sizes and distribution of women and children by family size for cohorts of women born around 1960 in eight countries

Country (birth cohort)		Mean family size	Percent distribution by family size (no. of children)					
			0	**1**	**2**	**3**	**4+**	**All**
			%					
Ireland	Women	2.26	18	10	29	24	18	100
(1961-62)	*Children*	*3.25*	*0*	*4*	*26*	*32*	*37*	*100*
United States	Women	1.98	16	19	35	19	11	100
(1960-61)	*Children*	*2.88*	*0*	*10*	*35*	*29*	*27*	*100*
England & Wales	Women	1.98	18	13	39	21	10	100
(1955-56)	*Children*	*2.84*	*0*	*6*	*40*	*31*	*23*	*100*
Netherlands	Women	1.82	19	16	41	18	7	100
(1960)	*Children*	*2.64*	*0*	*9*	*45*	*30*	*16*	*100*
Denmark	Women	1.84	13	19	46	21	10	100
(1956-57)	*Children*	*2.48*	*0*	*10*	*50*	*28*	*12*	*100*
Czech Republic	Women	1.99	7	16	55	17	5	100
(1961-62)	*Children*	*2.45*	*0*	*8*	*56*	*25*	*11*	*100*
W Germany	Women	1.48	24	27	34	10	5	100
(1961)	*Children*	*2.42*	*0*	*18*	*46*	*20*	*16*	*100*
Spain	Women	1.70	12	26	47	12	3	100
(1960-61)	*Children*	*2.28*	*0*	*15*	*55*	*21*	*9*	*100*

The data are based on Table 5 in Shkolnikov et al. (2007). Women's family size refers to the mean number of children born to women in each birth cohort, children's family size (i.e. sibsize) to the number of siblings in the families to which the children of those women belonged. Countries are listed by declining order of children's family size and are selected for illustrative purposes from nineteen countries included in the original. Mean family sizes for women and children and the percent distribution of women by family size are as presented in the original data. The percent distributions of children by family size are our calculations based on those data.

A comparison of West Germany and Spain in Table 1 is also revealing since West Germany had the lowest mean family size for women (at 1.48) of all the countries in the table but Spain, with a considerably higher mean family size for women (1.70), had the lowest mean sibsize for children (2.28, compared to 2.42 in West Germany). One feature here is the high level of childlessness among West German women – 24 per cent, double the corresponding level in Spain – which pulled down women's mean family size in West Germany but did not affect sibsize among their children. Among the children in West Germany, 16 per cent belonged to families of four or more siblings compared to 9 per cent in Spain. These patterns indicate the need to examine sibsize as a factor that is independent to some degree from women's cohort fertility and also show that the United States, along with other countries we examine later (the UK, Ireland and Denmark), still have a sufficiently large sibsize among children for it merit close attention as a possible axis of social differentiation among children.

Family size in the United States, 1900-2012

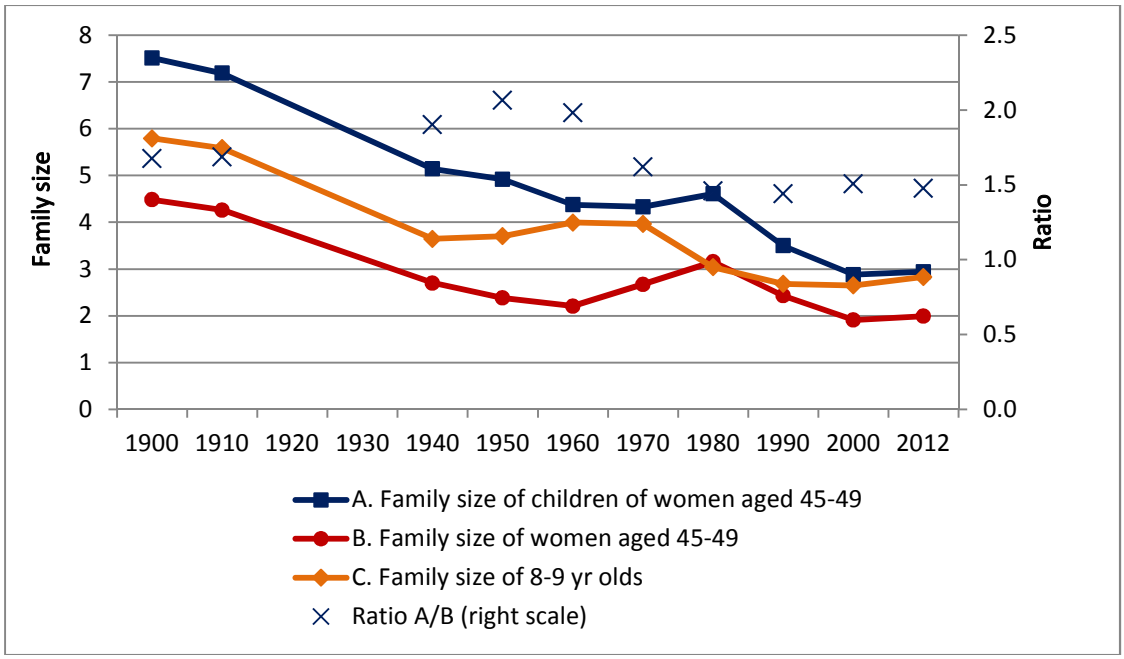
To provide a more detailed background for our later analysis of children's sibsize differentials in the United States, we now sketch trends in women's and children's family size in the US from 1900 to 2012. A question to women on number of children ever born was introduced in the US census in 1900 and, apart from 1920 and 1930, was asked in every decennial census up to 1990. From 1900 to 1960, the question was asked of ever-married women and from 1970 to 1990 it was extended to all women. From 1995, a Fertility Supplement periodically included in the Current Population Survey (CPS) replaced the census question on fertility as the main source of cohort fertility data for the US. Following a three-year interval after 1995, the Fertility Supplement has been fielded every second year since 1998. Coverage of the Fertility Supplement was limited to women aged 15-44 until 2012 at which point it was extended to women aged 15-50.

Here we use data from all censuses for which the 'children ever born' question was asked along with parallel CPS data for 2000 and 2012. With the exception of the CPS 2012, all the data are extracted from the Integrated Public Use Microdata Series held by the University of Minnesota (Ruggles *et al.* 2010). The CPS 2012 data, which at time of writing were not available through the IPUMS database, were accessed via

the US Census Bureau DataFerret facility. The data are subject to various limitations and sources of error. These are discussed in the Data Appendix below.

From these data sources, we construct three measures of family size which reflect the different perspectives from which this question can be viewed (Figure 1). One relates to completed fertility among women aged 45-49, a conventional indicator for analysis of this kind. (Because of the more limited age coverage of CPS 2000, the data for that year relate to women aged 40-44.) The measure used is the mean reported number of children ever born to women in this age-cohort. The trend in this measure since 1900 as shown in Figure 1 reflects a well-known picture. First is a steady fall from 4.5 children per woman in 1900 to 2.21 in 1960, reflecting the first phase of fertility decline (keeping in mind that women aged 45-49 would have been in their peak child-bearing years some 15 to 25 years previously). The effect of the post-war baby boom then shows itself, with the number of children per woman rising to 3.16 in 1980, following which downward movement resumes and the mean drops to 1.91 and 1.99 children in 2000 and 2012.

Figure 1. Family size for three population categories, United States, 1900-2012: women aged 45-49*, children of women aged 45-49* and 8-9 year-olds.



* Data for 2000 relate to women aged 40-44 and the children of those women.
Sources: Own calculations from public use samples from US Census of Population (1900-1990) and Current Population Survey 2000 & 2012 (see Data Appendix).

The second trend shown in Figure 1 takes the data for women aged 45-49 and looks at the same data from their children's perspective, using Preston's formula for deriving children's sibsize from data on women's fertility referred to earlier. (Similar data are reported by Preston (1976) for the period up to 1970, though Preston's data refer only to native-born American women while the data used here include the native and foreign-born and extend the series up to 2012.) Note that 'children' in this context does not refer to a specific age-category since the offspring of women aged 45-49 will typically range in age from infancy to their early 30s. The trend line for this group follows a broadly similar trajectory to that for family size among their mothers but at a level that is between 1.5 to two times higher. Early in the twentieth century, when women's completed cohort fertility was 4.5, the average child in a completed family was one of over seven siblings. By 1960, when women's completed fertility had fallen to 2.21, the average child's sibsize was still at 4.37 and had risen to 4.61 by 1980. It then entered a new decline, falling just below 3 in 2000 and 2012.

It is notable that, in contrast to the rise of almost one child in women's completed family size which occurred as a consequence of the post-war baby-boom, the rise in sibsize among their children was only 0.24. The smallness of this increase reflects the influence of a decline in childlessness among women as a driver of the baby-boom, a factor which as noted earlier tends to has different effects on women's and children's family size. After 1980, however, the balance of movement in women's and children's family size was reversed in that by 2000, the fall in women's completed family size was smaller than that of their children's sibsize (with a drop of 1 in the former compared to 1.6 in the latter).

These figures suggest, then, that sibsize has remained a more significant variable in children's family contexts since the mid-twentieth century than is often understood and needs to be tracked carefully in its own right. By the 1980s, although sibsize was much reduced since the early twentieth century, the average child still belonged to a family of four or five children. Sibling numbers dropped sharply in the following two decades, but the bottoming out that occurred in the early 2000s was at the quite high level of almost three siblings per family (and, as noted earlier, with 26 per cent in families of four or more children). Despite the modern fall in fertility, therefore, moderately large families represent a persistent

feature of family context for children in the United States up to the present and justify interest in this variable as a continuing potential source of disparities in children's family lives.

Family size among 8-9 year-olds

The measure of children's sibsize just looked at has the disadvantage that for each time-point observed it relates to a diffuse age-range of women's off-spring, spanning (as indicted earlier) from infancy to the early 30s – and spanning also a similar 30 or more year time-period of women's child-bearing. A picture that is more time and age specific and provides a more focused measure of temporal trends in children's sibsize can be drawn by concentrating on a narrow age-band of children and examining the sibling numbers in their families in successive birth-cohorts (as recommended in Lam and Marteleto 2013: 20-22). The data sources used in Figure 1 enable such a focus to be adopted by extracting a relevant age-band of children (in this instance, 8-9 year olds) from the micro-data and by linking those children with their mothers' reported number of children ever-born (along with another key variable we use later, maternal education). The linkage with mothers' children ever born provides a measure of children's sibsize from 1900 to the present.

Sibling numbers measured in this way are independent of whether siblings of the reference child are still resident in the family home or even whether they are still alive. Half-siblings who have the same mother and different fathers are captured in the sibling count but half-siblings who have different mothers and the same father are not. In all cases, the counts require that the child be co-resident with his or her mother so that the linkage in the data records with the mother's response to the children-ever-born question can be achieved. They also require that in years where CPS data are used (in the present instance, the years 2000 and 2012) the child is young enough for his/her mother to have responded to the Fertility Supplement questions (which as noted earlier were completed only by women up to age 44 in 2000 and up to age 50 in 2012). We focus on 8-9 year olds here as a suitable age-group to fit within these constraints. At that age children are old enough for their mothers to have advanced quite far in their family formation but young enough to be still largely co-resident with their mothers and not to have a large share of mothers who were beyond the age-thresholds for the CPS Fertility Supplement data

in 2000 and 2012. This focus, then, does not give us a picture of completed sibsize among children. But it does yield a consistent account of sibsize in middle childhood and allows us to trace change in an important aspect of children's family contexts over an extended period. It should be noted also that while the resulting family size data relate to a narrow age-band of children, the ages of their mothers are quite varied, ranging from early 20s to early 50s and with a mean age in the mid-30s. Over the period 1900-2012, the mean age of mothers of 8-9 year olds in the data we use here was at its lowest in 1980, at 33.95 years, and at its highest in 2012, at 36.99 years.

The changing sibsize of 8-9 year-olds is shown as the third measure of the trend in family size in Figure 1. This measure differs from that for children of women aged 45-49 in the first instance because in some periods – especially in the early twentieth century – sibsize among 8-9 year olds was well below that for children in completed families, reflecting the fact that many mothers of 8-9 year olds in that period had not yet completed childbearing. By the early 2000s, however, the gap had almost disappeared, implying that by then few women who had children aged eight or nine would go on to have more children. In addition, the focus on 8-9 year olds better captures the timing of the fall in children's sibsize in the second half of the twentieth century: the big drop occurred in the decade between 1970 and 1980, when sibsize among children in this age-group fell by almost one sibling. The decline continued more slowly to 1990, with a further drop of 0.36 siblings, but it rose back almost to the level of 1980 by 2012.

Changing SES Differentials in Sibsize of 8-9 Year-olds

We now come to our core concern, which is to examine trends in SES differentials in the sibsize of 8-9 year-olds in the United States. For this purpose, we use mother's educational attainment as a proxy measure of SES. Educational attainment has been measured in the US Census since 1940 and this is the year from which our analysis begins. Education as a proxy indicator for SES is most often measured by reference to fixed categories of educational attainment – such as elementary schooling, incomplete or complete high school, college level education and so on. However, the expansion of education since the 1940s has been so great that the distribution of the population over fixed education categories of this kind has changed dramatically

and provides a limited means of tracking relative social position. Among mothers of 8-9 year olds in the US data we use, for example, 57 per cent had no more than elementary education in 1940 but that proportion had dropped to 4.2 per cent in 2012. Likewise, in 1940, less than 8 per cent of mothers of 8-9 year olds had third level education. By 2012, that proportion had grown to two-thirds (counting primary degrees and postgraduate education – see panel A, Table 2).

In light of these large shifts in the educational composition of the population, a useful additional approach is to measure *relative* educational position based on fixed proportions of the educational distribution measured across time. Given that educational attainment is typically measured by reference to a limited number of educational categories and that populations typically are distributed in lumpy fashion across those categories, it is not possible to track exact identical proportions across cohorts. Our solution here is to aim to define and measure proportions which roughly capture relatively low and high positions in the educational distribution. We use approximations to the bottom and top educational deciles and quartiles for this purpose. Panel B in Table 2 shows the actual percentages of mothers of 8-9 year olds which these approximated deciles and quartiles contain while Panel C sets out the educational attainment boundaries which define these approximations. It is evident from panel B that there is considerable deviation from exact deciles and quartiles, yet our view is that the approximated deciles and quartiles, viewed alongside each other, give a meaningful picture. Note that in 2012, the concentration of the population on two educational levels – high school graduates and college graduates – was such that a meaningful approximation to quartiles could not be found and we use the top and bottom deciles only for that year.

Trends in mean sibsize among 8-9 year olds classified by the educational level of their mothers are shown in Figure 2, with Figure 2a based on fixed educational categories and Figure 2b based on relative educational level (bottom and top educational deciles and quartiles). The evolution of social inequalities in children's sibsize since 1940 revealed by these graphs shows a different trajectory from that suggested by trends in women's family size summarised earlier. It will be recalled from our earlier summary that researchers had identified the period from the 1940s to the 1960s as one when SES differentials in women's cohort fertility narrowed considerably, largely on account of rising family size among better educated women.

The much reduced but still substantial differentials that had emerged by the 1960s then persisted for some decades (see above).

Table 2: Educational distribution of mothers of 8-9 year olds, United States, 1940-2012

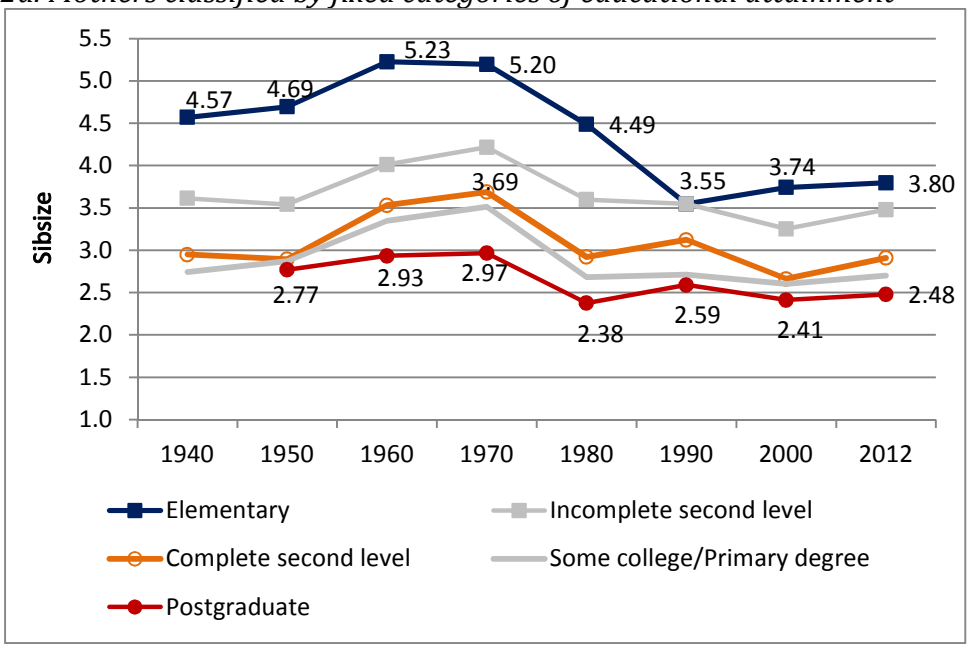
	1940	1950	1960	1970	1980	1990	2000	2012
Fixed educational categories (%)								
Elementary	57.0	37.3	21.3	12.6	7.3	5.0	4.5	4.2
Incomplete second level	20.8	25.1	25.5	23.8	17.6	13.7	8.7	7.7
Complete second level	14.5	25.9	36.5	43.9	42.5	33.4	33.6	22.7
Some college/ Primary degree	7.3	10.6	15.7	17.9	28.3	43.1	47.5	54.1
Postgraduate	0.4	1.1	1.0	1.7	4.2	4.8	5.7	11.4
Total	100	100	100	100	100	100	100	100
Relative educational level: approximations to bottom & top educational deciles and quartiles (%)								
Bottom decile	11.6	11.2	8.2	8.5	8.7	11.6	13.2	10.5
Bottom quartile	25.4	24.9	24.9	15.3	26.1	18.8	13.7	NA
Top quartile	20.0	34.6	16.0	17.1	14.8	26.5	25.8	NA
Top decile	6.9	10.2	11.1	7.4	11.6	17.0	5.7	11.4
Decile/quartile definitions								
Bottom decile	le G4	le G5	le G6	le G7	le G8	le G10	le G10	le G11
Bottom quartile	le G6	le G7	le G8	le G9	le G11	le G12 (no diploma)	le G11	NA
Top quartile	ge G12	ge G12	Some college	1 yr college	Assoc degree	Assoc degree	Bachelor's degree	NA
Top decile	1 yr college	1 yr college	2 yrs college	Bachelor's degree	Bachelor's degree	Bachelor's degree	Master's degree	Master's degree

le = less than or equal to; ge = greater than or equal to; G=Grade.

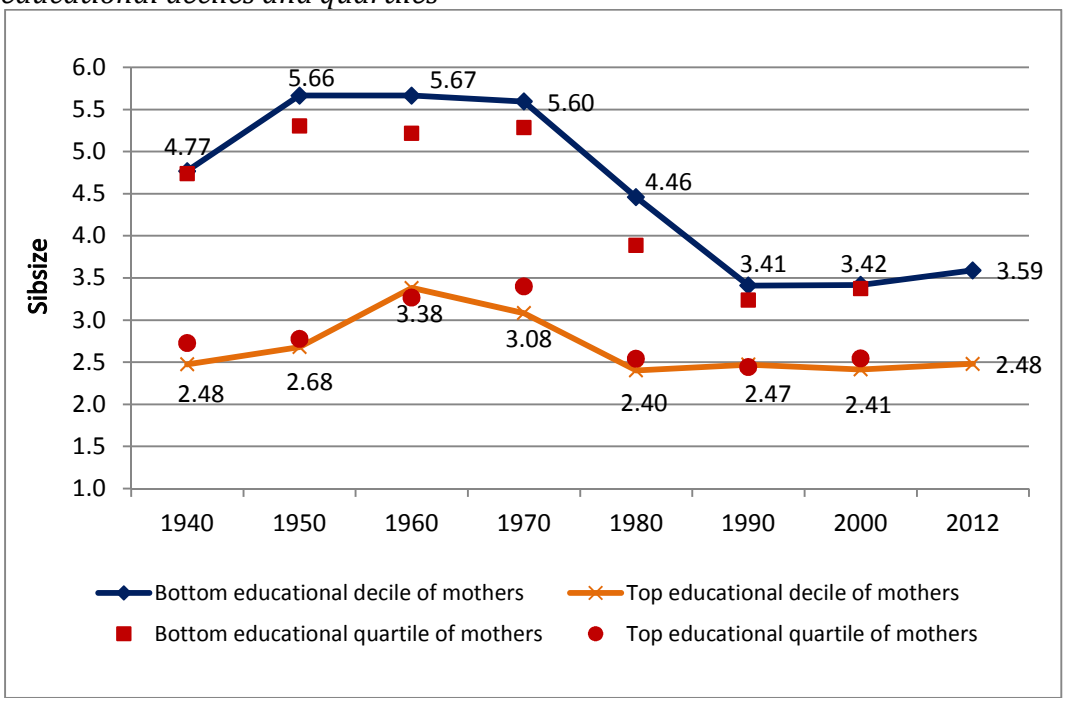
Sources: As Figure 1.

Figure 2. Sibsize of 8-9 year-olds by educational level of mothers, United States, 1940-2012

2a. Mothers classified by fixed categories of educational attainment



2b. Mothers classified by relative educational level: (approximate) top and bottom educational deciles and quartiles



Sources: As Figure 1.

Figure 2 suggests that change in children's sibsize differentials evolved with quite a different timing and composition. A narrowing emerged not in the two to three decades after 1940 but some three decades later, from around 1970 to 1990, and

not mainly because of rising sibsize among children of better educated mothers but because of falling sibsize among children with the least educated mothers. Looking at children with mothers in the bottom and top education deciles in Figure 2b, for example, the years between 1940 and 1970 were a period of either widening or stability in children's sibsize differentials, depending on the sub-period and metric examined. The absolute gap in number of siblings between the bottom and top deciles widened from 2.29 in 1940 to almost 3.0 in 1950 and by 1970 was still at 2.52. It was at that point that decisive contraction in the gap began. By 1990, it had reduced to 0.94 and hovered close to 1.0 for the following two decades. In ratio terms, the differential was widest in 1950, when sibsize among children of the bottom decile of mothers was 2.11 times that of children of the mothers in the top decile. In 1970, that ratio was still quite high at 1.81 but by 1990 it fallen to its lowest level of the entire period at 1.38. Thenceforth, it more or less stabilised at a level slightly above that of 1990.

The rapidly rising educational profile of mothers was one factor contributing to change in sibsize outcomes for children, and indeed the reduction by around two in the sibsize of children of the bottom decile of mothers in the years 1970-1990 shown in Figure 2b arose in part because the educational level of even the bottom decile was rising steadily in this period (see Table 2 above). Yet the more influential element was the change in family formation behaviour across all educational levels, especially among those on the bottom margins. Figure 2a shows that sibsize among children of mothers with elementary schooling dropped sharply between 1970 and 1990, even though that group represented a dwindling category of the population. In 1990, their 8-9 year olds had a slightly smaller sibsize (3.55) than had the children of mothers who were high school graduates twenty years previously (3.69). Thus, while mothers with elementary education may have represented an ever more marginalised sub-population in educational terms, their children came substantially closer to the middle ground in regard to sibling numbers. (We have estimated separately that had the pattern of educational attainment found in 1960 remained fixed until 1990 and only the sibsize formation patterns by educational level had changed in accordance with observed developments, 83 per cent of the decline in children's sibsize would have occurred anyway. This suggests then that less than one-fifth of the observed overall decline in their children's sibsize was due to rising

educational levels among mothers with some four-fifths due to changed fertility behaviour within educational categories.)

US differentials in comparative context

Trend data on children's sibsize similar to that for the United States are not readily available for other countries but some information is available for recent years and enables the current US situation to be placed in limited comparative context. Such comparison is of interest since, as already shown, the narrowing of SES differentials in children's sibsize in the US since 1970, though substantial, has halted over the past two decades at a level which still leaves a considerable gap in place. A key question is how the current US gap compares to that in other countries for which comparable data are available.

Here we have such data for three countries – the UK, Denmark and Ireland. Two of these – Ireland and the UK – have, along with the US, among the largest average sibsize for children in completed families among developed countries, with Denmark about mid-range on that indicator (Shkolnikov et al. 2007 – see also Table 1 above). Here, the focus is on sibsize among children in middle childhood, though the exact age ranges of children covered are somewhat older in the UK and Denmark (11 years) than in the US and Ireland (8-9 years). The data for the UK are drawn from the 2012 round of the UK Millennium Cohort Survey, a nationally representative longitudinal survey of children that commenced when the children were born in 2000. The Danish data are taken from the 2007 round of the Danish Longitudinal Survey of Children which commenced in 1995, along with linked data from national registers from which information on maternal education is drawn. The Irish data are derived from the public use sample from Ireland's Census of Population 2011 which is available from the IPUMS International database. The measure of children's sibsize in Ireland is constructed in a manner similar to that for the US data described earlier, using linkages to mothers' responses to a 'children ever born' question to establish children's sibling numbers. As before, we use maternal educational as a measure of SES but to facilitate cross-country comparison the number of educational categories is reduced to three – low education (incomplete second-level), medium (complete second level) and high (third level). The results of the comparison are set out in Table 3.

Table 3. Sibsize by educational level of mothers among children in middle childhood in the United States, UK, Denmark and Ireland.

	United States (8-9 year olds, 2012)	UK (11 year-olds, 2012)	Denmark (11 year-olds, 2007)	Ireland (8-9 year-olds, 2011)
Mothers' educational level	*Children's mean sibsize*			
Low	3.59	3.1	2.2	3.20
Medium	2.91	2.5	2.2	2.73
High	2.66	2.4	2.2	2.77
All	2.83	2.6	2.2	2.84
Absolute gap: low-high	*0.97*	*0.7*	*0*	*0.43*
Ratio low/high	*1.35*	*1.29*	*1.00*	*1.16*
N	*3074*	*10970*	*4354*	*6141*

Sources: US Current Population Survey 2012; UK Millennium Cohort Survey (2012 round); Danish Longitudinal Survey of Children (2007 round) with linked population register data; Census 2011 (Ireland). US data are extracted from IPUMS USA and Irish data from IPUMS International. The UK and Danish data were extracted by Patricia Keilthy.

These results show that the sibsize differential in the US is the largest among the four countries, with (as noted earlier) an absolute gap in sibsize between children of the least educated and most educated mothers of 0.97 and a low/high ratio of 1.35. However, the US is not a complete outlier since the gap in UK is reasonably close to the same level, at 0.7 in absolute terms and a low/high ratio of 1.29. Denmark is the most remote from the US pattern since it shows no gradient whatever, an outcome that is line with other findings on the more egalitarian distribution of family patterns in the Nordic states (Andersson et al. 2007). Ireland has a modest negative gradient which is closer to Denmark than to either the US or the UK and is also slightly non-linear in that the smallest mean sibsize is found in the medium rather than the highest education category). The relatively flat Irish gradient is of interest since Ireland lacks the egalitarian family policies found in Denmark and even today resists some aspects of modern fertility control practices (particularly in regard to abortion – Fahey and Nixon 2014). The smallness of the sibsize inequalities found in Ireland despite these features gives an indication that social gradients in children's

sibsize might vary in unexpected ways across countries and would be need to be documented carefully before explanation could be attempted.

Summary and conclusion

Judith Blake's landmark work on the effects of family size on children in the US in the 1980s made passing reference to the decline in family size and the rise in family instability as possible counterbalancing trends for children's well-being (Blake 1989: 285). While the significance for children of rising family instability has been intensely investigated since then, trends in sibsize have attracted less attention and their role as a possible force for greater equality in children's family circumstances has been little noted. This may have been due to a perception among scholars that, following the temporary post-war baby boom, family sizes had become too small to act as a significant source of change or variation in children's family contexts. In any event, there has been little follow-through on the possibility of counterbalancing trends raised by Blake and the topic of SES differentials in family size no longer attracts the attention in research and public commentary that it once did.

This paper has sought to revive interest in this topic. It began by highlighting the difference between women's family size and children's family size (sibsize), as identified by Preston (1976), and by emphasising the need to focus on sibsize as the factor that is relevant for children's outcomes. It then outlined in broad terms the place that changing sibsize patterns size have played in the evolution of children's family contexts since the early twentieth century. It followed that by looking more closely at developments during the SDT, that is, roughly since the 1960s. It has asked especially whether a narrowing of SES differentials in sibsize in the latter period may have had a social levelling effect for children that countered trends towards greater inequality arising from other strands of socio-demographic change. Using American data, it has shown that in the early years of the SDT, although children's sibsize had dropped from the very high levels of the early twentieth century, it remained quite substantial, having risen somewhat in the immediate post-war years. The average 8-9 year old in 1970 was one of almost four siblings, while the average sibsize in just-completed families at that time was somewhat larger at 4.33. Sibsize then entered a phase of decline. For 8-9 year olds, the decline occurred between the 1970s and the 1990s when mean sibsize fell by about 1.3

children. Yet, as sibsize more or less stabilised in the early 2000s at an historically low level, it remained substantial in absolute terms at an average just short of three and with over a quarter of children belonging to families of four or more siblings. These findings point to sibsize as an important axis of change in the course of the SDT but also as a factor that remained large and varied enough up to the present to warrant examination as a possible source of social disparities affecting children.

The paper then explored those social disparities among 8-9 year olds in the US since 1940, using maternal education as a measure of SES. It found that large differentials by maternal education had persisted until the 1970s but then had narrowed sharply up to 1990, following which they more or less stabilised up to the present. The dominating feature in this evolution was the sharp reduction in sibsize among children of the least educated mothers between 1970 and 1990. The average 8-9 year old with a poorly educated mother 'lost' over two siblings in these years while the counterpart child with a highly educated mother lost just over half a sibling. The effect was to reduce the gap in sibsize between children in those two levels of SES from over 2.5 siblings to about one sibling, a large but still incomplete social levelling in this aspect of children's family lives. A limited international comparison suggested that the gap in sibsize of around one child between families of least educated and best educated mothers in the United States is relatively high by international standards but not a complete outlier (UK data reveal a gap of almost similar extent).

The two decades or so immediately after World War II are often regarded as a golden age of security and stability in family life for children, founded on a mix of strong marriage and limited family size. The present analysis has qualified this picture in two ways, first by pointing to the persistence of quite large sibsizes for children in spite of women's overall low fertility and second by highlighting how unequal the distribution of sibsize was. Less advantaged children in that period may have avoided the disruption of family structures that later came to be associated the 'unravelling of marriage', as Furstenburg (2011) calls it. But they did not escape the pressures arising from having many siblings, keeping in mind that the least advantaged 8-9 year olds in the US in the 1950s and 1960s had sibsizes of between five and six children, the same as the mean sibsize for all 8-9 year olds of half a century earlier. They thus grew up under the lingering shadow of what for the

previous century had been seen as a core social concern about the family life of the poor. It was not until the 1980s that that shadow of large family size faded and by the 1990s, while it had not disappeared, it was a much less significant source of divergence between lower and upper SES children than it had been in the 'golden age' of two to three decades previously.

The broad-brush picture of these developments set out here prompts a host of questions which lie beyond the scope of this paper to answer and point to many directions for future research. A re-examination of the historical record on family size differentials focusing on sibsize rather than women's fertility is needed to refine our understanding of the historical context. For both the remote and the recent past, detailed disaggregation of sibsize trends is a prerequisite to any attempt at explaining those trends. Disaggregation would also have to take account of SES measures other than maternal education such as income, occupational level, race and ethnicity and would have to take account of the social position of fathers as well as mothers. In addition, more detailed anlysis would need to incorporate differentials in closely related socio-demographic factors such as childlessness, age of childbirth and duration of couple relationships.

Questions also arise about the impact of narrowing sibsize differentials on children. We have taken for granted here that the impact was positive, reflecting a quantity-quality trade-off, but we have not tried to identify in what ways or by how much that trade-off worked. In suggesting that the overall effect was to counter other disequalising tendencies in children's family contexts, we have not sought to quantify the net effect of the counter-acting forces, nor to argue that the net balance was positive. All we would say is that the reduction in sibsize differentials was an important force for equality for children when much else seemed to be flowing in the opposite direction. Much further probing is needed to establish how fully this was so. Our concern here has been to try to indicate here why such probing would be worth the effort.

Data Appendix

The table below presents some details on the samples from the US Census and the Current Population Survey used in the present paper, including the samples on two sub-populations of interest – women aged 45-49 and children aged 8-9. In all cases, the samples were extracted from larger samples available in the IPUMS and US Census Bureau databases since the full samples were too large to allow for easy handling. For all years bar 1940 and 1950 sampling for present purposes was straightforward, using the subsampling procedures available in the relevant databases. In the US Census Bureau's design of the 1940 and 1950 censuses, however, one of the variables of interest here, the 'children ever born' question, was asked only of sampled members of selected households ('sample line' cases) in such a way that straightforward selection of cases from the IPUMS database would have produced biased samples. Various solutions are provided in IPUMS to correct for such biases. Here we used the 'self-weighting' (SEFLWTSL) variable created by IPUMS to enable a representative 'flat sample' of mothers and their children to be extracted for those years (see the sampling documentation for 1940 and 1950 at https://usa.ipums.org/usa/sampdesc.shtml for details).

The data drawn from these samples are subject to a number of errors, of which those affecting the 'children ever born' variable are of most relevance here. First, the census question on this item was asked only of ever-married women from 1900 to 1960 (it was asked of all women from 1970 onwards). In the present paper, as is the norm in fertility analyses based on these data (Viser et al. 1968, Preston 1976), single women in those years are counted as being childless, a procedure that would tend to produce an underestimate of fertility since it excluded non-marital births. Family size estimates may also have been biased because the families of women who had died were not included, a factor that was likely to have been more significant in the earlier period and may have had particular biasing effects because of higher mortality among higher parity women. However, Kiser et al. (1968: 300-02) checked census-based fertility estimates in 1960 against those based on vital statistics sources and contemporary Current Population Surveys and showed that census underestimates of births were likely to be small (in the region of 3-4 per cent). They judged that most births to single women were likely to be included in the census

count either because the women in question eventually married or because they reported themselves as married in the census.

Appendix table. Study Samples from IPUMS and US Census Bureau

Year	Source	Base sample extracted from source	Sample of women aged 45-49	Sample of 8-9 yr olds
		Number of cases		
1900	IPUMS Census	88155	1802	3608
1910	IPUMS Census	85220	1935	3235
1940	IPUMS Census	865465	3651*	3615**
1950	IPUMS Census	1045031	7751*	7423**
1960	IPUMS Census	78488	2336	3014
1970	IPUMS Census	95596	2849	3672
1980	IPUMS Census	84724	2117	2606
1990	IPUMS Census	79172	2332	2140
2000	IPUMS CPS	122176	5096	3454
2012	US Census Bureau DataFerret (CPS)	133252	4696	3544

CPS: Current Population Survey. * Women in self-weighting sample (see text) ** Children of women in self-weighting sample

As is explained in the text above, our estimates of sibsizes among 8-9 year-olds were derived by attaching mothers' responses to the 'children ever born' question to the data records for their children using the linking procedures available in the IPUMS databases (for CPS 2012, which were drawn directly from the US Census Bureau using the DataFerret facility, we made the linkage ourselves). This means

that data on sibsize are missing for children who were not living with their mothers and where mothers did not respond to the children-ever-born question. Non-residence with mothers could be due to a range of factors – the mother's death, early departure of the child from the mother's home or other form of separation between child and mother. The extent of these factors varied over time and introduces an element of variation in the responses that we have not tried to correct for here. Non-response by mothers to the children ever born question also varied over time and in CPS 2000 was exacerbated by the age threshold of 44 year beyond which women were not asked the question (9.9 per cent of 8-9 year olds in that year had mothers who were above that age-threshold – the raising of the age threshold to 50 in 2012 largely eliminated this problem). For children for whom the children-ever-born data were missing, we explored the option of interpolating sibsize from counts of co-resident siblings in the household. However, we concluded that because this procedure would omit siblings not living in the household, it would be likely to introduce as many biases as it would correct. We chose to make no corrections for non-response in the belief that resulting biases would be too small to make a substantive difference to results.

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