Configurations of Sibship in Low-Fertility Settings: A Microsimulation Approach

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Rationale

This research examines the life course variation in available close lateral kin (siblings) under a range of low-fertility conditions. At issue is the variation in siblings across different plausible demographic scenarios at critical phases in an individual's life: during childhood, at parental death, and at one's own death. In addition, the population distribution of sibship sizes and diversity of sibship gender and age configurations are explored.

Siblings tend to be the longest-lived relationships in people's lives, and have been shown to be central kin ties and remain important in individuals' networks even when friendships and conjugal family supplant one's family of origin. They are consequential, if ambivalently so, for individual outcomes (for a review see Steelman et al. 2002), but retain their own importance into adulthood and old age ((Wellman and Wortley 1989; White and Riedmann 1992; Cicirelli 1995; Connidis 2009). Shared family, environmental and period contexts make siblings unique among network ties. Early and late in life one's networks tend to be small and dominated by kin (Cornwell, Laumann, and Schumm 2008), and siblings provide continuity in personal networks through events such as union dissolution and widowhood (Campbell, Connidis, and Davies 1999). Siblings, while not a substitute for non-kin friendship ties, have their own distinctive role in a person's support network (Voorpostel and Van Der Lippe 2007).

Siblings appear to be particularly critical at three life course stages: during childhood (Steelman et al ibid), when elderly parents require care (Connidis and Kemp 2008), and in later life (particularly near one's death) (Lu and Bumpass 1993; Cicirelli 1995). While sibling availability may be generally important regardless of sib characteristics, the nature of sibling relationships varies with the sex and age composition of the sib dyad (Voorpostel et al. 2007).

Demographic change yields correspondent changes in family and the availability of kin (and vice versa), but the joint impact of changes in fertility, mortality and nuptiality for family structure are not obvious. Fertility and mortality tend to shrink kin networks while extending the duration of kin ties.

Parents' fertility behaviors, in particular, are consequential for sibship composition. Postponement of entry into union and the resultant shift in the age pattern of fertility influence sibship size and density (age concentration), as well as the likelihood that children will, at any given age, have a surviving parent. Changes in nuptiality further complicate matters: delayed union formation, changes in rates of dissolution and reconstitution, and variable fecundability by age affect the probability that one will have a given sibship configuration.

It is popularly assumed that lower fertility (lower mean completed parity or TFR) results in smaller sibships. Low fertility, in and of itself, does not guarantee smaller sibships. The distribution of completed parities (the number of children born to a woman by the end of her childbearing career), not the average number of children per woman, determines the mean and variety of sibship size. Consider, for example, two populations A and B, each with the same mean number of children (2.1), but each with a distinct distribution of completed parities:

Mother's Generation					Children's Generation		
Completed Parity	**% Women at parity**		**Kids/woman**		**# Siblings**	**% Kids with # siblings**	
	A	*B*	*A*	*B*		*A*	*B*
0	5	15	0	0	n/a	0	0
1	25	20	0.25	0.2	0	12	10
2	35	20	0.7	0.4	1	33	19
3	25	30	0.75	0.9	2	36	43
4	10	15	0.4	0.6	3	19	29
Sum	100%	100%	2.1	2.1	Sum	100%	100%

The first scenario yields children with average 1.6 siblings, and eighty-eight percent of children have one or more siblings. By contrast, the second scenario yields children an average of 1.9 siblings, although the proportion having one or more siblings is quite close (ninety percent). Perhaps obviously, low population fertility does not alone predict completed family size or number of siblings. Further, the distribution of number of sib dyads is not the same as the distribution of completed family size, that is, family size from a child's perspective is different from that of the parent's, and in fact is always greater on average as long as there is any variance in fertility (Preston 1976).

Paradoxically, the potential diversity of sib dyads can increase with fertility decline. The possibility of only having a sister; only an older sibling; or only a sibling of the opposite sex increases with smaller completed family size. Where the total possible variation in sibships may decrease with declining family size, the variation in children's experience of sibship may increase.

Despite siblings' importance, research to date has not described the life course composition of sibship, much less that composition in contemporary settings. This is due, in part, to the lack of attention given to measuring even basic demographic features of sibship. This is unsurprising: the complexity of kinship poses nontrivial empirical challenges. In survey data, respondent reports about siblings are subject to nontrivial error. White (1998), comparing respondents' reports about siblings in the Comparing reports in the 1987-88 and 1992-94 National Survey of Families and Households, finds discrepancies in respondents' reports of number of siblings across waves, particularly among respondents with complex families and complex family histories. More complex measurement – sex, age and mortality – yields both greater respondent burden and opportunity for error. Complete measurement of sibship requires data spanning the birth of the oldest sibling through the death of the longest surviving, for all siblings, in addition to whatever other characteristics (nuptiality, etc.) are of interest. This is a tall order.

Data and Methods

Demographic microsimulation is used to generate fictional populations characterized by a set of varying demographic schedules. Microsimulation has been used extensively for demographic projection and for the analysis of historical and contemporary populations (for a review see Morand et al. 2010). Early social simulation approaches were plagued by unsupportable assumptions about the independence of social phenomena (Ruggles 1993), but contemporary microsimulation methods largely address these issues (Imhoff and Post 1998; Billari and Prskawetz 2003).

This study uses SIMKIN (Casterline, 2001, 2012), software for the microsimulation of kin sets. The simulation generates a population of individuals, "egos," and their kin. Ego is guaranteed parents, but the presence of all other kin is conditional on the fertility, mortality and nuptiality patterns of ego and her kin-network. This study uses a combination of empirical and theoretical distributions to model patterns of fertility, mortality and nuptiality characteristic of low fertility, low mortality populations. Kin networks are generated and measured from the perspective of individual egos, examining the sibship composition over the entire life span and measuring siblings ever-had; the gender and age composition of sibships; and the duration of sibling ties. Variation across demographic scenarios is explored through theoretical schedules of age at onset of childbearing, total fertility rate, and the distribution of completed parity.

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