Sibling Experiences During Childhood and Adolescence Among the 1988 and 2000 Finnish Birth Cohorts

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EXTENDED ABSTRACT

Background

Family lives are changing in the Western context, and also across the Nordic countries.[1,2] Over the past 50 years, as the rate of union dissolution increased rapidly, so did the share of reconstituted and complex families.[3] The increase in repartnering and multi-partner fertility has led to a growing proportion of children who have half-siblings and step-siblings from the partners of their biological parents.[4,5]

Family complexity in terms of siblings occurs across all family forms. Children may have full siblings who share both biological parents, half-siblings who share one biological parent, or stepsiblings who share no common biological parents but are linked through the union of a biological parent to another partner who also has children from a previous union. Irrespective of the biological, social, and legal links between siblings, from the point of view of the child, the sibship is ascribed rather than voluntary. A step-sibship is arguably a temporary relationship, as it may end if the stepparent and the biological parent separate.

The prevalence of different types of sibships is interesting from various perspectives. Siblings are important for the individual life course in terms of social connections and support. Sibships have been considered key social relationships, whether they are supportive or stressful.[6,7] Siblings typically have shared common early life experiences and the relationship also tends to endure throughout the life course, forming an important social and economic safety net.[6,7] However, it has been suggested that full, half-, and step-sibships are qualitatively different social relationships. There are differences in social investment and contact between full and other types of siblings, which appear to go beyond the obvious explanatory factors such as age (e.g., age differences tend to be larger between half- and step-siblings than full siblings), geographical proximity, and time spent together while growing up.[5,8] Moreover, there is some indication that full siblings are more likely than half- and stepsiblings to provide each other with support and to share the burden of family caretaking responsibilities across the life course. As an example, when adult children provide care and support to their elderly parents, full siblings often share the burden,[9] while half- and stepsiblings may be less likely to be involved.[10,11]

Furthermore, full, half-, and step-sibling experiences throughout childhood and adolescence have been linked with various social and wellbeing-related outcomes across the life course.[12] While full siblings have generally been considered to promote wellbeing, a notable share of the literature on half- and stepsiblings draws from the so-called deficit-comparison perspective: even after addressing the role of family structure (e.g., reconstituted family, single parent), having half- and stepsiblings has been associated with decreased mental well-being[13] and behavioural problems[14,15] in early life.

The reasons behind this association are unclear, but two proposed mechanisms relate to social norms and evolutionary psychology. As for the former, families are defined by mutual social expectations and boundaries concerning who is included and what this inclusion entails.[16] When these norms and expectations are ambiguous — which more often occurs among reconstituted families that have gained

or lost members[5,16]— family members may not have a clear and shared understanding of their individual roles and relationships with others, which may be stressful.[17] On the other hand, theories based on evolutionary psychology highlight the importance of genetic relatedness, which is expected to ease competition and conflict between family members and is therefore reflected in the relationships between siblings.[18,19] In addition to half- and step-sibling relationships being directly affected by these mechanisms, the relationship the child has with the shared social or biological parent may play an additional role in sibling relationships.[20] Sibships are important for the social (e.g., time, support) and economic (e.g., funds for activities, education, diet quality) resources available to each child, both while growing up and later in life.[21,22] Studies have suggested that parents may invest more in their biological than step-children,[23,24] which in turn may affect the relationship between siblings.[24]

Despite the implications of sibships for social, economic, and wellbeing-related outcomes across the life course, relatively little is known about the prevalence and sequences of full, half- and stepsiblings from the point of view of the child, especially outside the United States.[4] In countries with high divorce rates such as US, Norway and Sweden, around one in four children has been estimated to have at least one half-sibling.[25–27] US surveys have further estimated that during the 2000s, more than 10% of children had a co-resident half-sibling,[28,29] 1.5-2% had a co-resident stepsibling,[28,29] and less than 1% had both co-resident half- and stepsiblings.[30]

There is also a need to quantify the changes in sibling experiences among different population subgroups. Multi-partner fertility is more prevalent among parents occupying a lower socioeconomic position (SEP)[27] and there is some indication that the socioeconomic gap may be widening.[31] As a result, it is possible that those born to families in a lower SEP with limited economic resources may have increasingly complex sibling experiences. Mapping sibling compositions and their evolution will extend our knowledge of the changes in family forms and experiences and increase our understanding of the family-related mechanisms for the reproduction of socioeconomic advantage and disadvantage.

This study has two main aims. First, we will describe the different sibling compositions and sequences of full, half- and stepsiblings from birth until age 16 among the 1988 and 2000 full birth cohorts of Finnish children. Second, we will address the magnitude of the change in sibling compositions by both birth cohort and maternal education. Instead of cross-sectional data of self-reported sibships, we utilize total population, longitudinal administrative register data. These data provide a unique opportunity for identifying all siblings throughout the early life of full birth cohorts. Moreover, the data do not suffer from non-random attrition or misreporting. We are also able to address sibling experiences irrespective of family type, residence, or whether the siblings were underaged, as prompted by prior research.[4,13,28] To our understanding, no previous study has assessed the socioeconomic differences in sibling compositions throughout the childhood and adolescence, the change in the sibships over time.

Data and methods

This study is based on longitudinal register data of all children in the 1988 (n = 64 809) and 2000 (n = 56 529) Finnish birth cohorts. We included those who resided in Finland from birth to age 16 (1988 n = 64 597; 2000 n = 56 413; excluding the 328 children who migrated or died). The cut-off was chosen as these cohorts were still likely to live with their parents and therefore also their siblings at these ages. These cohorts were less likely to gain full and half-siblings beyond these ages and are likely to have fewer close relationships with stepsiblings gained in later life. The permission to access these anonymous data were obtained from the appropriate national register holders (Statistics Finland study permission #TK-53-339-13).

Using the personal identification number assigned to all Finnish residents and information from the birth register, we linked the index child with their biological parents and any living full and half-siblings. We then annually identified any new union formations for each biological parent using household identifiers and data on cohabiting, marital and registered unions (including same sex partners if married or in a registered union). For each new partner, we identified all living biological children from the previous unions of the new partners and included them as stepsiblings of the index child. We also distinguished between half- and stepsiblings from one or multiple partners. The main analyses focus on any siblings irrespective of residence as in Finnish population registers, individuals are registered to reside in one household and there are no data on custody arrangements.[32] Co-resident siblings are bound to have more contact and shared resources than siblings living in separate households, therefore the results for co-resident siblings will be presented as an additional analysis, bearing in mind these data limitations.

These panel data were further linked with data concerning demographic characteristics of the index child and the biological parents. Maternal education was measured using the highest completed degree at the end of the year when the child was born and classified into three categories: basic (International Standard Classification of Education (ISCED) 2011 levels 0-1), secondary (ISCED 2-4) and tertiary (ISCED 5 or higher).

To asses cohort sibling experiences, we will utilize a sequence analysis approach and create annual sibling composition states for each index child from birth to age 16.[33] We will consider the following mutually exclusive states: 1) Only child, 2) full siblings only, 3) half siblings only, 4) stepsiblings only, 5) full and halfsiblings, 6) full and stepsiblings, 7) half- and stepsiblings, 8) full-, half- and stepsiblings, 9) all compositions with half- and/or stepsiblings from multiple parental unions. Thus, in categories 3-8, the half- and stepsiblings were gained from one partner of either biological parent.

We will then create state distribution[34] and relative frequency sequence plots (RFSs)[35] to assess sequences of the nine sibling states, separately by cohort and maternal education. State distribution plots provide an aggregated overview of the frequency of each state between ages 0 and 16. For the individual sequences, RFS will be created, which are useful for large data where some sequences disappear among the more common patterns (overplotting). We will further calculate years spent in different sibling compositions and the mean number of transitions between them for each cohort and maternal education group.

R and the TraMineR (version 2.2-1) and TraMineRextras (version 0.6.0) packages will be used for the sequence analyses.[36] We will divide each cohort or cohort by education group into 100 similarly sized frequency groups from which a representative sequence will be chosen and plotted as an index plot. The representative sequence ("medoid") will be identified using the optimal matching technique, which measures the distances between the sequences in each frequency group. The insertion and deletion costs will be set following convention to the value "1" when deriving the substitution cost from the transition matrix for each time point. We will plot the selected sequence of each frequency group for 100 medoids in each group.

Expected results

The preliminary results show that having only full siblings is the most prevalent sibling experience among both the 1988 and 2000 birth cohorts (Table 1). Due to declining fertility, the latter birth cohort was smaller than the former, and the share of children with full biological siblings also decreased slightly over time. Yet there was no increase in those with no siblings by age 16 as half- and stepsiblings

fully compensated for the decline in full siblings. Among the 1988 cohort, 29.4% had a half and/or stepsibling by age 16, while among the 2000 cohort, this share was 35.0%. The preliminary results therefore show increasing complexity in sibling compositions from the 1988 to the 2000 birth cohort.

Table 1. Basic characteristics, Finnish birth cohorts 1988 and 2000.

	Cohort			
	1988		2000	
Maternal and family characteristics at index child's birth				
Mother's age [mean (SD)]	28,8	[5,2]	29,9	[5,5]
Mother's education, % of individuals				
Basic	24,5		17,3	
Secondary	45,6		40,7	
Tertiary	29,8		42,0	
Sibling experience by age 16, % of individuals				
Only child	5,8		5,1	
Ever had at least one full sibling	84,6		83,3	
Ever had at least one halfsibling	22,7		27,9	
Ever had at least one stepsibling	15,5		17,8	
N of individuals	64,597		56,413	

The preliminary results also show notable educational differences in the prevalence of the different sibling types. As an example, among those children in the 1988 birth cohort whose mother had not completed secondary education, the prevalence of sibling compositions with half- and/or stepsiblings was 42.1% at the age of 16, compared to 56.3% at the same age among the 2000 cohort. Among those with tertiary education, the respective shares were 19.0% and 24.4%.

We therefore expect to find an increase in the average number of years spent in different sibling compositions that include half- and stepsiblings, in the prevalence of more complex sibling compositions, and in the number of changes in sibling compositions between cohorts. We also expect there to be an educational gradient in the prevalence of half- and stepsiblings. Whether the increase in complexity is larger among those children born whose mothers have lower educational attainments is unknown. We hope that these results will further highlight the role of siblings for family complexity.

References

1. Carlson MJ, Meyer DR. Family complexity: setting the context. *The Annals of the American Academy of Political and Social Science*. 2014;654(1):6-11.

2. Thomson E. Family complexity in Europe. *The Annals of the American Academy of Political and Social Science*. 2014;654(1):245-258.

3. Brown SL, Stykes JB, Manning WD. Trends in children's family instability, 1995–2010. *Journal of Marriage and Family*. 2016;78(5):1173-1183.

4. Brown SL, Manning WD, Stykes JB. Family structure and child well-being: Integrating family complexity. *Journal of Marriage and Family*. 2015;77(1):177-190.

5. Sanner C, Russell LT, Coleman M, Ganong L. Half-sibling and stepsibling relationships: A systematic integrative review. *Journal of Family Theory & Review*. 2018;10(4):765-784.

6. McHale SM, Updegraff KA, Whiteman SD. Sibling relationships and influences in childhood and adolescence. *Journal of Marriage and Family*. 2012;74(5):913-930

7. Cicirelli V. *Sibling Relationships Across the Life Span*. Springer Science and Business Media New York; 1995.

8. Tanskanen AO, Danielsbacka M, Jokela M, David-Barrett T, Rotkirch A. Diluted competition? Conflicts between full- and half-Siblings in two adult generations. *Frontiers in Sociology*. 2016;1.

9. Chanfreau J, Goisis A. Patterns of help and care by adult only children and children with siblings. *Ageing & Society*. Published online April 6, 2022:1-24.

10. Wiemers EE, Seltzer JA, Schoeni RF, Hotz VJ, Bianchi SM. Stepfamily structure and transfers between generations in U.S. families. *Demography*. 2018;56(1):229-260.

11. Coleman M, Ganong LH, Hans JD, Sharp EA, Rothrauff TC. Filial obligations in post-divorce stepfamilies. *Journal of Divorce & Remarriage*. 2005;43(3-4):1-27.

12. Strow CW, Strow BK. Evidence That the Presence of a Half-Sibling Negatively Impacts a Child's Personal Development. *The American Journal of Economics and Sociology*. 2008;67(2):177-206.

13. Halpern-Meekin S, Tach L. Heterogeneity in two-parent families and adolescent well-being. *J Marriage Fam*. 2008;70(2):435-451.

14. Fomby P, Goode JA, Mollborn S. Family complexity, siblings, and children's aggressive behavior at school entry. *Demography*. 2015;53(1):1-26.

15. Apel R, Kaukinen C. On the relationship between family structure and antisocial behavior: Parental cohabitation and blended households*. *Criminology*. 2008;46(1):35-70.

16. Carroll JS, Olson CD, Buckmiller N. Family boundary ambiguity: A 30-year review of theory, research, and measurement. *Family Relations*. 2007;56(2):210-230.

17. Cherlin A. Remarriage as an Incomplete Institution. *American Journal of Sociology*. 1978;84(3):634-650.

18. Hamilton WD. The evolution of altruistic behavior. *The American Naturalist*. 1963;97(896):354-356.

19. Hamilton WD. The genetical evolution of social behaviour. II. *Journal of Theoretical Biology*. 1964;7(1):17-52.

20. Ahrons CR. Family ties after divorce: Long-term implications for children. *Family Process*. 2007;46(1):53-65.

21. Downey DB. When bigger is not better: Family size, parental resources, and children's educational performance. *American Sociological Review*. 1995;60(5):746-761.

22. Keister LA. Sharing the wealth: The effect of siblings on adults' wealth ownership. *Demography*. 2003;40(3):521-542.

23. Case A, Paxson C. Mothers and others: Who invests in children's health? *Journal of Health Economics*. 2001;20(3):301-328.

24. Danielsbacka M, Tanskanen AO. The association between unequal parental treatment and the sibling relationship in Finland: The difference between full and half-siblings. *Evol Psychol*. 2015;13(2):147470491501300220.

25. Andersson L. Oh half-brother, where art thou? The boundaries of full- and half-sibling interaction. *Demographic Research*. 2020;43:431-460.

26. Thomson E, Lappegård T, Carlson M, Evans A, Gray E. Childbearing across partnerships in Australia, the United States, Norway, and Sweden. *Demography*. 2014;51(2):485-508.

27. Amorim M, Tach LM. Multiple-partner fertility and cohort change in the prevalence of half-siblings. *Demography*. 2019;56(6):2033-2061.

28. Manning WD, Brown SL, Stykes JB. Family complexity among children in the United States. *Ann Am Acad Pol Soc Sci*. 2014;654(1):48-65.

29. Kreider RM, Ellis R. *Living Arrangements of Children: 2009*. US Census Bureau; 2011. Accessed June 30, 2022. https://www.census.gov/library/publications/2011/demo/p70-126.html

30. Tillman KH. "Non-traditional" siblings and the academic outcomes of adolescents. *Social Science Research*. 2008;37(1):88-108.

31. Jalovaara M, Andersson L, Miettinen A. Parity disparity: Educational differences in Nordic fertility across parities and number of reproductive partners. *Population Studies*. 2022;76(1):119-136.

32. Miettinen A, Hakovirta M, Saarikallio-Torp M, et al. Lasten vuoroasuminen ja sosiaaliturva : Vuoroasumisen nykytila ja merkitys etuus- ja palvelujärjestelmän kannalta. [In Finnish] Valtioneuvoston Julkaisuja, 2020.

33. Abbott A, Tsay A. Sequence analysis and optimal matching methods in sociology: Review and prospect. *Sociological Methods & Research*. 2000;29(1):3-33.

34. Billari FC, Piccarreta R. Analyzing demographic life courses through sequence analysis. *Mathematical Population Studies*. 2005;12(2):81-106.

35. Fasang AE, Liao TF. Visualizing sequences in the social sciences: Relative frequency sequence plots. *Sociological Methods & Research*. 2014;43(4):643-676.

36. Gabadinho A, Ritschard G, Müller NS, Studer M. Analyzing and visualizing state sequences in R with TraMineR. *Journal of Statistical Software*. 2011;40:1-37.