

## **Sibling Complexity and Mental Health Outcomes in Late Adolescence – Evidence from Finnish Birth Cohorts**

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### ***Background***

Over the past five decades, rising rates of divorce, repartnering, and childbearing across multiple partnerships have transformed family structures in many high-income countries.<sup>1,2</sup> These demographic shifts have led to an increase in family complexity and instability (i.e., changes in family composition) and sparked a substantial body of research on their implications for children's mental health and well-being.<sup>2,3</sup> This work is often motivated by theoretical perspectives suggesting why complexity and instability may be harmful to mental health. For instance, boundary ambiguity theory stresses how families rely on shared norms and expectations concerning who is included in the family and what this inclusion entails.<sup>4</sup> In reconstituted or blended families, these boundaries can become unclear, making it difficult for members to navigate their relationships, potentially leading to strain and conflict.<sup>5</sup> The Family Stress Model in turn suggests that changes in family composition, such as the addition of a stepparent, can disrupt routines and generate stress, affecting children's wellbeing.<sup>6</sup>

Most of the existing literature has focused on parental union status only, overlooking siblings. As family structures evolve, children increasingly experience sibling complexity, defined as the presence of half- or stepsiblings. In countries like the United States, Norway, Sweden, and Finland, estimates suggest that up to one in four children now has at least one half sibling<sup>7-10</sup> while the share with step-siblings is lower.<sup>11,12</sup> Recent studies on the determinants of mental health have begun to address this gap and a growing body of empirical evidence now links having half or stepsiblings with decreased mental well-being,<sup>13</sup> behavioral problems,<sup>14-16</sup> and internalizing and externalizing problems in early life.<sup>17</sup> While these associations often persist even after accounting for family type (e.g., two biological parents, single-parent, or stepfamilies), disentangling the effects of sibling complexity from broader parental union dynamics remains a methodological challenge.

One approach to isolating the influence of sibling complexity involves comparing children within the same family type but who differ in sibling composition, for example children living with both biological parents, with or without older half-siblings. These studies generally find that children with older half-

siblings face disadvantages, even after controlling for factors such as parental socioeconomic status and residential instability.<sup>13,16</sup> Still, recent research points to the importance of difficult to account for selection mechanisms related to parental union histories, which may also shape child outcomes in complex families.<sup>18</sup>

This study contributes to the literature by examining how mental health outcomes in late adolescence vary not only by family type but also by the presence of half- and stepsiblings. Drawing on longitudinal register data from multiple birth cohorts followed from birth to age 16, we capture a wide range of family structures and changes in them, including detailed information on maternal and paternal full, half-, and stepsiblings. Informed by prior research, we also consider how family characteristics, such as parental union histories and socioeconomic conditions, may shape these associations. In doing so, we seek to better understand the independent and combined effects of family type and sibling complexity on adolescent mental health.

### ***Data and methods***

This study is based on annual, longitudinal register data of all children in the Finnish birth cohorts 1998–2002 (Statistics Finland study permission #TK-53-339-13). We included all those who resided in Finland from birth to age 16 ( $n \approx 280,000$ ). The cut-off was chosen as at these ages, the index children were still unlikely to have moved out of the parental home.

Using unique personal identification numbers assigned to all Finnish residents, we linked each index child to their biological parents, their parents' subsequent cohabiting or married partners (including same-sex registered partnerships), and all maternal and paternal full, half-, and stepsiblings (biological children from the previous unions of the new partners). We also distinguished between older and younger and maternal and paternal half-, and stepsiblings and siblings registered to reside in the same household with the index child.

The family type was defined based on parental union status observed annually from birth to age 16. We focus on selected family trajectories, such as continuous residence with both biological parents with or without older half-siblings from prior unions, or experiencing parental separation at a specific age, followed by residence with a single mother, again with or without older half-siblings. This approach allows us to differentiate between complexity (e.g., presence of a stepparent, or half and stepsiblings) and instability (e.g., changes in parental union status, new siblings) related to the parents and siblings.

These data were further linked to demographic and socioeconomic information on the child and their parents, including parental education (based on ISCED), household income, mental health history, and union trajectories extending back ten years prior to the child's birth.

Our outcome measures are psychiatric disorders and self-harm at ages 17–19, identified through specialized healthcare and mortality records. We use Poisson and other regression models to estimate associations between sibling complexity and mental health outcomes. To address potential confounding, we apply propensity score matching based on parental union history, child age at key family transitions, and socioeconomic background. In additional analyses, the models are stratified by sex and family type to explore potential heterogeneity in associations.

### ***Expected results***

We expect that the more complex family experiences – identified by both family type and sibling experiences – will be associated with elevated risks of adverse mental health outcomes in late adolescence, compared to children who experience neither family complexity nor instability. The preliminary results without propensity score matching show that visits to specialized care due to mental health related reasons in late adolescence were more prevalent among children with half or stepsiblings than without, irrespective of family type. For example, children raised by both biological parents but with an older half-sibling had a 44% (95% confidence interval 34-55) higher risk of visits to specialized care due to mental health than children growing up with both biological parents but without such sibling complexity. However, we expect that adjusting for factors such as parental union histories and socioeconomic position will attenuate these associations, highlighting the importance of selection mechanisms.

### ***Conclusion***

This study will advance understanding of how sibling complexity and family type jointly shape adolescent mental health outcomes. Our findings underscore the need to consider the specific configurations and histories that shape children's family contexts.

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