

Home to Health: A Sibling Correlation Approach to Family Background and Mediating Effects on Early Adulthood Mental Health

INTRODUCTION & BACKGROUND

Systematic disparities in young people’s mental health diagnoses remain a persistent concern in contemporary welfare states, despite comprehensive social policies and universal healthcare guarantees (Link & Phelan, 1995; Pearlin, 2010; Tarkiainen et al., 2024; Vargas Lopes & Llana-Nozal, 2025). In recent years, register-based and school survey evidence from Europe and beyond has documented enduring socioeconomic gradients: children and adolescents from less advantaged backgrounds face a heightened risk of mental health conditions, with disparities apparent in both high-income and emerging economies (Reiss, 2013; Vargas Lopes & Llana-Nozal, 2025). At the same time children from low socioeconomic backgrounds fare worse in school and suffer from less advantageous educational trajectories. These patterns reflect the enduring impact of the “long arm of childhood,” a concept denoting how early social, economic, and familial environments interact to shape cumulative (dis)advantage through health, education, and well-being into adulthood (Elder, 1998; Ben-Shlomo & Kuh, 2002; Dannefer, 2003).

Research increasingly emphasizes that mental health inequalities do not develop in isolation but are embedded within social stratification and life-course exposures. The fundamental social causes model posits that family background operates as a “distal” factor, transmitting risk through multiple direct and indirect pathways, including parental education, household income, school performance, and peer environments, each subject to genetic and environmental influences (Link & Phelan, 1995; Pearlin, 2010). Such processes are evident in a range of European, North American, and global studies, which consistently show that lower parental education and household income remain robust predictors of adolescent internalizing and externalizing problems, even where health and education systems are highly developed (Reiss, 2013; Vargas Lopes & Llana-Nozal, 2025). In the Nordic context, where universal welfare institutions are designed to buffer against social disadvantage, register data demonstrate that lower parental education and income remain robust predictors of adolescent mental health problems (Reiss, 2013; Vaalavuo et al., 2022).

Socioeconomic background exerts its effects through both direct exposures (such as family adversity, parental loss, or instability) and indirect, cumulative mechanisms across the life course. Children from low-SES families consistently display a two- to threefold risk of

psychiatric diagnoses compared to peers from more advantaged backgrounds and the gradients are strongest in adolescence, with the strongest associations tied to parental education, (Vargas Lopes & Llana-Nozal, 2025; Reiss, 2013; Vaalavuo et al., 2022). While some disparities are context-dependent, systematic reviews and international comparative studies have found consistently elevated risks for youth mental health problems associated with economic hardship, migration background, and family instability (Nicholson et al., 2012; Vargas Lopes & Llana-Nozal, 2025).

Mediation by education and school experience is of particular importance. Cross-national evidence demonstrates that educational progression and school achievement serve as critical channels through which family background translates into mental health risks (Haddadi Barzoki, 2024; Steare et al, 2024; Vargas Lopes & Llana-Nozal, 2025). School engagement and supportive environments can buffer psychosocial vulnerability, while school failure and disengagement often exacerbate distress reinforcing inequalities established early in life (Umberson et al., 2010). Positive early experiences, such as social support, optimism, and safe environments, contribute to resilience and persistently protect against mental health problems, whereas chronic stressors and cumulative disadvantage heighten vulnerability to reduced life satisfaction and well-being (Umberson et al., 2010; Ben-Shlomo & Kuh, 2002).

This study addresses these themes by investigating how family background shapes young adults' mental health, focusing on the mediating roles of educational trajectory and academic performance. Using large-scale linked data on siblings, educational track choice, and mental health outcomes, our approach allows robust analysis of the total and mediated effects of family background across different social and institutional contexts. By decomposing sibling correlations into direct and indirect components, our study advances understanding of the cumulative and dynamic mechanisms that generate health inequalities during emerging adulthood offering policy-relevant insights for targeted education and social interventions.

DATA, APPROACH, AND EXPECTATIONS

Data: This study utilizes comprehensive, linked population-register data (TK-53-1490-18) encompassing birth cohorts from 1960 to 1995, with primary analytical emphasis on cohorts born after 1970 to maximize consistency in variable availability. Individuals are linked to biological siblings born within the target cohort range and co-residing during childhood, as well as their biological parents. To ensure robust estimation of family background effects, singletons are included: exclusion would significantly underrepresent real-world family

structures, since average family size is below two children and nearly half of all families with children have only one child (Statistics Finland, 2019).

Outcome variables: We link annual inpatient care registers from 1987–2020 (THL/2180/14.02.00/2020) to capture psychological hospitalization for ICD-coded disorders (excluding admissions for external injuries) to capture severe mental health risks. Psychotropic medication records (available from 1995–) provide an additional, less stringent metric of mental health problems, accommodating subclinical and outpatient presentations. These outcomes offer a multidimensional view of mental health during youth and emerging adulthood, with cohort restrictions applied for completeness.

Mediating variables are constructed from end of compulsory school grade point averages (GPA) drawn from upper secondary application registers. Detailed annual degree data spans 1987–2022, allowing reconstruction of each individual’s educational career up to age 25: completion of compulsory education (typically age 16), followed by upper-secondary (gymnasium or vocational; admission based on GPA and entrance exams), and any further degrees obtained within the follow-up period. Nationally, 86–92% of youth transition to post-compulsory education. 16% of sample individuals never apply and another 13% do not graduate after initial application, capturing both selection and attrition in educational careers.

Analytical Approach: This study utilizes recent methodological innovations in social mobility and stratification research by applying the sibling correlation decomposition method as developed by In & Karlson (2025, unpublished). Traditional sibling correlations in multilevel designs quantify the proportion of variance in outcomes, such as mental health or educational attainment, explained by shared family and contextual factors (Solon, 1999; Anderson et al., 2024). We decompose the total sibling correlation down into direct and indirect effects via observed, sibship-varying mediators. Specifically, the indirect effect is defined as the product of the sibling correlation in the mediators (e.g., educational trajectory, GPA) and the fixed-effects (within-family) coefficient of the mediator on the outcome, rescaled to align with the original sibling correlation metric. The direct effect represents within-family similarity in outcomes net of mediation through school performance or educational track choice. Our decomposition thus quantifies how much of the total influence of family background on young adult mental health risk is attributable to educational achievement, and how much remains as unexplained family factors, providing new clarity on transmission mechanisms beyond what standard regression mediation yields (Baron & Kenny, 1986; Bernardi & Ballarino, 2016).

Expectations: Guided by the “long arm of childhood” and cumulative disadvantage theory (Elder, 1998; Dannefer, 2003), and social determinants models (Link & Phelan, 1995; Pearlin, 2010), we conclude with some study expectations. (a) A substantial portion of variance in young adults’ mental health (both clinical and pharmaceutical outcomes) will be accounted for by shared family background, as measured through sibling correlations. (b) Educational trajectories and school achievement will mediate a considerable share of the total family influence, consistent with cross-national findings that school experiences transmit socioeconomic disparities in mental health, especially in late adolescence and transition to adulthood (Vargas Lopes & Llana-Nozal, 2025; Haddadi Barzoki, 2022). (c) We further expect the sibling correlations remain somewhat stable, or have slightly increased for the younger cohorts, due to two reasons: the persistence of disparities regardless of equalizing policies and efforts and the increased importance of family background on educational outcomes during the recent two decades. Finally, extensions may reveal heterogeneity by gender, school performance, educational trajectories, family type, or level of parental education, in line with comparative studies showing uneven transmission of (dis)advantages in different institutional contexts (Bernardi & Ballarino, 2016; Anderson et al., 2024).

The preliminary results show that, indeed, about 63% of the variation in young adults’ severe mental health risks are explained by the family background at the population level ($a =$), and the effect size has fluctuated being stronger for the 1975-1984 cohorts than for the earlier or later cohorts ($c \neq$). Educational tracks and GPA however yield competitive mediation effects ($b \neq$). The upper secondary track choice reflects suppression mediating -9.4% of the total effect of family background on a clinical mental health risk. The indirect effect of origin on education is positive, while the indirect effect of education on destination is negative indicating that choosing an academic upper secondary education over vocational decreases the risk of mental health issues. GPA on the contrary runs in the same direction with the total effect mediating 9.2% of it. The total mediating effect of GPA is positive for those who choose vocational and negative for those who choose academic secondary education. By decomposing the omnibus family background effect with this robust method, the further findings will illuminate specific mechanisms of cumulative advantage/disadvantage and inform policy strategies to interrupt cycles of mental health inequality through targeted educational and family supports. The enhanced, standardized approach enables meaningful cross-country and cohort comparison, advancing the population science of mental health stratification.

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