

Abstract

How can we understand and explain intrinsically social and interpersonal dynamics? This thesis examines romantic relationships – their dynamics, dissolution and consequences. Thematically it can be situated at the intersection between sociology, demography and genetics, an interdisciplinary field often termed sociogenomics. The four papers that comprise the thesis span different stages of family life, and two main dimensions can be distinguished. The first dimension, intra-couple dynamics, is addressed in Papers I and II. Paper I, *The Genetics of Partnership Dissolution* examines individual differences that influence the risk of relationship breakdown, while Paper II, *Social Genetic Spillovers*, explores educational spillovers on health within romantic relationships. The second dimension concerns inter-generational family processes: Papers III and IV focus on the consequences of parental divorce, exploring children's short-term educational outcomes and their longer-term relationship trajectories, respectively.

A sociogenomic perspective entails integrating sociology and genetics to understand how social environments and genetics co-produce differences in social outcomes, with the purpose of gaining a better understanding of the complexity of social processes (Conley, 2016; Freese, 2018; Mills & Tropf, 2020). In this thesis, genetic methods are used to address social science questions on partnership dynamics in several cutting-edge ways. In Papers I and II they are used both as predictors, capturing individual differences that influence relationship dynamics, and as proxies for social mechanisms, which can help address methodological challenges in studies of partner influence. In Papers III and IV, they are treated as confounders in intergenerational associations, and controlling for them helps to better isolate environmental influences.

All four studies draw on large Norwegian Population Register data. In both Paper I and II, we link the register data with the Norwegian Mother Father and Child Cohort Study (MoBa) and use polygenic indices (PGIs), which are summary measures of a person's genetic disposition for a trait or outcome. In Papers III and IV, we use register data to identify adoptees and their adoptive parents, and the Norwegian National Twin Register to identify twin pairs and their offspring. These data sources enable the use of two complementary quasi-experimental approaches, adoption- and Children-of-Twins design, to account for genetic and environmental selection processes that can bias estimates of parental influence on offspring.

Paper I, *The Genetic Antecedents of Partnership Dissolution*, is the first to investigate genetically influenced individual-level differences and their associations with partnership dissolution using molecular genetic data and PGIs. There are three main findings from the study. In a Genome-Wide Association Study we estimated the total influence of common genetic variants on partnership dissolution to be 3.5 % and 9 % for men and women respectively, which is lower than what has been found in previous studies using biometric methods. We identified several genetic dispositions associated with the likelihood of dissolving a partnership, including educational attainment, risk behaviors, and mental health conditions. Finally, we used sibling fixed effects, to assess the extent to which these genetic associations were causal. Four PGIs survived this stringent test, namely educational attainment, age at sexual debut, subjective well-being, and neuroticism. Higher scores contributed to lower dissolution-likelihood. In sum, these findings underscore that there is a genetic component to partnership dissolution and several polygenic traits involved. PGIs allowed us to investigate multiple individual traits that are rarely available in phenotypic datasets.

In Paper II, *Social Genetic Spillovers – Do Partners’ Genetics Influence Health Behaviors?* MoBa and PGIs are used to examine whether the health benefits of education extend beyond the individual to their romantic partners. We assessed three health outcomes, namely body mass index (BMI), depression symptoms, and alcohol use frequency. To strengthen causal inference, we employ a within-family design. By using a partner’s educational attainment PGI (EA-PGI) as the predictor, meanwhile controlling for her/his parents’ EA-PGIs, the study isolated a ‘more causal’ estimate of a person’s genetic disposition for education on the partner's health outcomes. The results revealed two partner effects from male to female partners: a modest negative association between the EA-PGI on BMI, and a positive association with alcohol use frequency. The first finding aligns with the established link between higher education and improved health, also suggesting a ‘contagious influence’, while the second shows that higher education may not have uniformly beneficial crossovers, also in line with research showing a positive relationship between education and alcohol consumption at the individual level (Bye & Rossow, 2023; Jacobsen, 1989). Additionally, our findings showed that estimates of assortative mating (PGI similarity between partners) may be inflated by population stratification. The main takeaway from the study is that education can have spillover effects within romantic relationships.

In Paper III, *Educational Penalties of Parental Partnership Dissolution: Exploring Selection and Causation with Adoptive and Twin Families* I assessed the consequences of divorce for children’s educational outcomes, measured by mean grade point average (GPA) at age 16, and high school completion. The adoption sample consisted of foreign-born adoptees (born 1986–2006) and

compared their educational outcomes to a matched sample of non-adoptees. In the CoT-design, the outcomes of children of twins who were discordant and concordant for partnership dissolution were compared. The findings from this study revealed that there is in fact a causal environmental effect of parental divorce on educational outcomes. Both the adoption design and the CoT-design showed that GPA and completion rates were reduced if parents divorced. However, compared to non-adopted peers, adoptees were less affected by parental dissolution, and within-family measures in the CoT-design were also lower than between-family measures. This indicates that confounding –i.e. the selection perspective– is important in intergenerational family processes.

In the fourth paper, *Parental Divorce and Children's Partnership Dynamics: Evidence from Norwegian Adoptive and Twin Families*, we examined long-term consequences of parental divorce, specifically whether it affected the likelihood of children 1) forming a cohabiting partnership or marriage, and 2) experiencing a relationship dissolution later in life. The central question was whether potential associations were primarily driven by environmental factors such as the family environment and the divorce itself, or if genetic factors passed down from parents to offspring constituted a confounding factor in the intergenerational transmission. The results suggested that parental divorce had minimal influence on offspring's likelihood of forming a committed partnership, but that it increased the risk of partnership dissolution. Also in this study, both research designs revealed selectivity in who experienced divorce. The Children-of-Twins analysis provided evidence of a causal social intergenerational transmission of dissolution, above and beyond genetic and environmental confounding, whereas the adoption results were less conclusive on whether the association reflected a causal effect or mainly selection.

Together, these four studies show that genetic factors contribute to shaping family-demographic behaviors and outcomes, and that sociogenomic data and designs can serve as a means to uncover causal processes. By leveraging polygenic indices, large population-based samples, and advanced within-family designs, the thesis provides new insights into individual- and meso-level factors shaping relationship dynamics and responses to family strain, within the Norwegian macro-level setting.