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Health of Immigrant Children: The Role of Immigrant Generation, Exogamous Family Setting, and Family Material and Social Resources

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ABSTRACT Although the children of first-generation immigrants tend to have better health than the native population, the health advantage of the children of immigrant families deteriorates over generations. It is, however, poorly understood where on the generational health assimilation spectrum children with one immigrant and one native parent (i.e., exogamous families) lie, to what extent family resources explain health assimilation, and whether the process of assimilation varies across health conditions. We seek to extend our understanding of the process of health assimilation by analyzing the physical and mental health of immigrant generations, assessing the role of exogamous family arrangements, and testing the contributions of family material and social resources to children's outcomes. We use register-based longitudinal data on all children residing in Finland, born in 1986–2000, and alive in 2000; these data are free of reporting bias and loss to follow-up. We estimate the risk of receiving inpatient and outpatient care for somatic conditions, psychopathological disorders, and injuries by immigrant generation status. Our results show evidence of a negative health assimilation process, with both first- and second-generation immigrant children having a higher prevalence of physical problems and particularly mental health problems than native children that is only partially explained by family resources. We find that the children of exogamous families are at especially high risk of developing psychopathological disorders. These results provide strong support for the hypothesis that children of exogamous families constitute a specific health risk group and that the impact on children's health of family social and material resources seems to be secondary to other unobserved factors.

KEYWORDS Health assimilation • Exogamous families • Psychopathological disorders • Finland

Introduction

In recent decades, European countries have experienced considerable increases in immigration flows. As a consequence, the need to monitor the health status of immigrants and their children has increased. Research shows that immigrants represent a

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specific health risk group, and knowledge of immigrant health is essential to reducing health inequalities in general (Giannoni et al. 2016; Wilkinson and Marmot 2003). Although the importance of this issue has been broadly recognized, strategies aimed at monitoring and managing the health consequences of migration in Europe have so far been insufficient (Rechel et al. 2012; WHO 2010). Focusing on the health of immigrant children and adolescents can help us better understand the integration process, of which health is a fundamental dimension.

Previous literature has described how the health of immigrants differs across generations. These studies have generally shown that compared with the health of the native population, the health of the immigrant population is better in the first generation but is worse in the second and subsequent generations (Hamilton et al. 2011; Mossakowski 2015; Rumbaut 1994). This phenomenon is thought to result from at least two mechanisms: (1) the positive selective nature of migration (Abraído-Lanza et al. 1999; Akresh and Frank 2008; Jasso et al. 2004; Kennedy et al. 2006), and (2) the negative health assimilation process of immigrants in the receiving country (Antecol and Bedard 2006; Biddle et al. 2007; Hamilton et al. 2011).

The first mechanism—selectivity—represents a broad range of positive traits that convert into good health, even though immigrants often also have negative social determinants of health, such as low education and low income. Because of selectivity—a phenomenon known in the literature as the healthy immigrant effect (HIE)—first-generation immigrants tend to have a lower prevalence of a number of health outcomes and lower mortality than natives and immigrants of the second and third generations. The selection process described here refers to the experiences of first-generation adult migrants who made the decision to migrate and who were then exposed to the barriers/opportunities associated with selectivity. Among children, selectivity does not operate directly because children do not decide to migrate themselves. In this case, selectivity refers to the parents' nonmaterial and social resources. These resources can include culturally protective factors, such as high levels of social support, or positive personal attitudes, such as grit (Ghatak et al. 1996). The combination of all these mechanisms—that is, the economic and social capital of the family and the family's biological traits—may transfer to the children the advantages of migration selectivity. Research that has documented the advantaged outcomes of first-generation immigrant children has often focused on very early life measures, such as birth weight (Padilla et al. 2009). Less attention has been paid to the health and well-being of immigrant children at later stages of their life course, such as during pre-adolescence and adolescence (Hamilton et al. 2011; Hernandez and Charney 1998; Mendoza 2009).

The second mechanism—negative health assimilation—calls into question the classical model of social assimilation. The social assimilation model assumes that the social differences between immigrants and natives will decrease over generations due to immigrants' upward mobility. Comparatively, the negative health assimilation model assumes that the health of immigrants will worsen across generations (Alba and Nee 1997; Gans 2007; Hamilton et al. 2011; Platt 2005). The process of health assimilation over successive immigrant generations may be due to the loss of the initial advantage immigrants enjoyed through a natural process of regression to the mean (Giuntella 2017; Jasso et al. 2004). However, the process of assimilation has also been explained by the increasing exposure of immigrants to the environmental risk factors that native-born individuals are exposed to since birth as well as by the consequent adaptation of immigrants to the lifestyles and health behaviors

of natives (Abraído-Lanza et al. 1999; Akresh 2007). Another potential explanation for the worsening of health conditions across generations is that immigrant children often undergo a stressful or unsuccessful integration process in the receiving country (Mossakowski 2015).

When studying the generational gradients in immigrant health, children who are born to one native and one foreign-born parent—hereafter referred to as children of exogamous families—may constitute an important risk group. Intermarriage, defined as marriage between people of different races, castes, cultures, or religions,[1] has long been recognized as an indicator of the inclusion and the integration of immigrants (Alba 2005). Although the relationship between intermarriage and integration has been called into question (Rodríguez-García et al. 2015; Song 2009), empirical evidence has shown that this multicultural family setting can facilitate the process of integration in children by encouraging social exchange between social groups while reducing marginalization and related prejudice (Kalmijn 2010).

Another mechanism through which exogamous marriage is considered beneficial is that it is associated with better economic outcomes than marriage between two immigrants, even after accounting for the endogeneity of such marriages (Furtado and Trejo 2012). The positive outcomes observed among the children of exogamous marriage are thought to be driven by the ability of these children to adapt to different cultures and the resilience that comes with developing such an ability.

However, some research has also shown that intermarriage does not always result in positive outcomes for the offspring. Children living in exogamous families may find it difficult to identify with one or both social groups of their parents (i.e., the maternal or paternal social group) because they face disapproval and social pressure from the members of both groups (Bratter and Eschbach 2006). This social pressure to identify with the majority group can cause stress in children (Campbell and Eggerling-Boeck 2006), resulting in negative physical and psychopathological outcomes. These mechanisms are likely to occur during adolescence, a phase of life when the individual starts to make sense of the self and to build his/her identity (Campbell and Eggerling-Boeck 2006:149). Living in an exogamous family may make this process especially difficult, which could in turn affect a child's health. In the United States, evidence showed that the incidence of low birth weight and infant mortality is higher in children of second-generation intermarried Hispanics than in children of endogamously married Hispanics (Giuntella 2016).

In this article, we use high-quality register data with a large sample size to study whether living in an exogamous family is associated with the mental and physical health of children and adolescents aged 10–18 years (hereafter, *children*). Taking Finland as a case study, we aim to (1) assess the health assimilation process among children of immigrants by comparing the health of first- and second-generation immigrants and children born to exogamous parents with that of native-born children to determine whether children in exogamous families represent a specific health risk group and whether the exogamous family setting plays a role in the generational gradient; (2) account for the potential explanatory role of family social and economic resources, as well as of potential stressors (family stability and the mother's health status), on the relationship between immigrant generation and adolescent health; and (3) test whether the genera-

[1] Intermarriage is defined in the analytical part of this work as marriage between one immigrant and one native partner.

tional gradient operates in different ways and whether children in exogamous families are more or less likely than second- and first-generation immigrants to receive care for certain causes. Because different causes of inpatient and outpatient care refer to different health dimensions, analyzing these causes enables us to analyze different processes. Psychopathological conditions may be more directly connected with integration issues than other causes: for example, poor mental health has often been linked to a lack of community support, stigma associated with particular family settings (such as exogamous families), and rejection by the members of one or more social groups (Bratter and Eschbach 2006). Injuries include all forms of damage to the body that are caused by accidents, self-harm, or violence and that are treated with specialized care. Injuries can be related to risky health behaviors or hazardous environments. Evidence suggests that injuries in adolescence are related to family background (Remes et al. 2019). Also, adolescents who engage in risky behavior are at higher risk of being injured in various ways (Begg et al. 1998). Given that somatic conditions reflect all health problems that pertain to the body, these conditions are the most general indicators of a child's physical health and can be directly linked to the family's socioeconomic conditions (Cockerham 2007).

Evidence on the effects of being raised in an exogamous family setting on the offspring's clinically assessed physical and mental health is still scarce. To the best of our knowledge, our study is the first to examine children in exogamous families as a specific risk group and to compare the health assimilation process of these children with that of other generations of immigrants in the receiving country.

Previous Evidence on Associations and Mechanisms

The classical model of social assimilation implies that the socioeconomic conditions for immigrants improve and that the differences between natives and immigrants therefore disappear across immigrant generations (Alba and Nee 1997; Gans 2007; Hamilton et al. 2011; Platt 2005). However, immigrants experience a negative assimilation process specifically for health, with health conditions worsening across generations (Hamilton et al. 2011). The generational health gradient that results from the negative assimilation process is partly shaped by the selective nature of migration that characterizes the experiences of first-generation immigrants (HIE) (Abraído-Lanza et al. 1999; Markides and Coreil 1986). The HIE is driven by the selectivity of immigrants (i.e., the healthiest individuals are more likely to initiate migration and to reach the destination countries) and by cultural factors (e.g., lower rates of smoking, less alcohol use, and more familial and social support) (Palloni and Arias 2004; Ronellenfitsch and Razum 2004). By contrast, second- and higher-order generations of immigrants have health profiles that are more comparable with those of natives.

Earlier quantitative and qualitative sociological research examined the ability of children living in multiracial families[2] to develop multiple identities and the effects this

[2] In this section, we refer to categories such as "multiracial families," "racial groups," and "ethnic groups" as they were conceptualized in the research cited. There are slight conceptual differences between these terms as they are used in the theoretical background that guides our work and as they are used in our analyses. In our analyses, we consistently use the term *exogamous families* to refer to those family settings in which one parent is native and the other parent is foreign-born. There are, of course, some cultural and

pressure can have on their psychological well-being. Studies have found, for example, that children who are able to socially identify with both groups report higher levels of well-being (Campbell and Eggerling-Boeck 2006) and of psychological adjustment (Jackson et al. 2012) than children who are not. The ability to turn their multiracial identity into a psychological resource can help children integrate more easily into both cultural contexts (Binning et al. 2009). Those who find it difficult to convert their multiracial identity into a resource are at higher risk of developing psychological disorders (Jackson et al. 2012). Some authors have found that unclear or malleable identification with one racial/cultural group is associated with poorer psychological health (Sanchez et al. 2009). One limitation of these studies is that the variables they used are all self-rated constructs, which makes it more difficult to identify the sequence of the processes. Discrimination is also likely to play a role in this identification process because the children of mixed-ethnicity families may be exposed to social discrimination by members of both groups. Moreover, some scholars have found an association between children's perceptions of being discriminated against and elevated levels of distress (Todorova et al. 2010), especially in the context of identity formation (Sellers et al. 2003). A U.S. study that focused specifically on health found that the incidence of low birth weight and infant mortality was higher in children of second-generation intermarried Hispanics than in children of endogamous couples (Giuntella 2016).

Several different sociodemographic mechanisms can help to explain the health differences between immigrant generations and within exogamous family settings. Mother's age at childbearing is a strong predictor of a child's outcomes, with both young and advanced maternal ages being associated with an increased risk of adverse outcomes for the child, including preterm birth and infant mortality (Conde-Agudelo et al. 2005). However, an advanced maternal age appears to have positive associations with a child's later-life outcomes, such as cognitive development, educational outcomes, and adult health (Barclay and Myrskylä 2016; Goisis et al. 2017; Myrskylä et al. 2013). It is well-known that the fertility schedules of immigrant women differ from those of native women. Compared with native mothers, immigrant mothers tend to have more children and at younger ages (Milewski 2010). These differences in the demographic profiles of mothers might be reflected in differences in the health of their offspring.

Socioeconomic status, as indicated both by education and income, is linked both directly and indirectly to health outcomes (Adler et al. 1994; Adler and Ostrove 1999). The parents' educational levels are indirectly linked to their children's health outcomes: highly educated parents are more likely than less-educated parents to provide their children with ample social and material resources and to encourage healthy behaviors, including the wise use of medical care (Leigh 1983). Education also provides parents with cultural awareness of health conditions and disease prevention (Ross and Wu 2006). Among the mechanisms that may explain the relationship between parental background and adolescent health are experiences of chronic stress and low self-esteem due to poverty, which can mediate the relationship between parental education and depressive symptoms in adolescents (Mossakowski 2015). Of specific interest to us, given our objectives, is that previous research has found that the distribution of educational attain-

societal differences between the U.S. context (the focus of much of the literature) and the European context (where this study is set) that we do not want to neglect. This clarification is provided to prevent any potential confusion.

ment differs between immigrant and exogamous families and native families and that these patterns vary by country (Dustmann and Glitz 2011). Income levels and unemployment rates are also likely to differ between these families, given that immigrant-native wage gaps have been observed in many countries (Aldashev et al. 2008; Chiswick and Miller 2009). Thus, accounting for education, labor force status, and income is important when studying health differences between immigrants and natives.

A number of studies have found strong associations between family structure and stability for various health outcomes of children. Children generally fare better in married-couple households than in other family structures, such as in cohabiting families (Schmeer 2011). This pattern has been attributed to unmarried couples having fewer economic resources than married couples and to cohabitation being less socially acceptable in some countries. Although children's health tends to be better in a two-parent than in a single-parent household, stability in the home appears to be more important than the number of parents living with the child (Mariani et al. 2017; Ziol-Guest and Dunifon 2014). Parental conflicts and union dissolution are linked to poor child health, given that a child's health can suffer due to increased stress, and to poor health behaviors that result from both stress and altered parenting (Troxel and Matthews 2004). The risk of marital dissolution is higher among exogamous couples than among endogamous couples because exogamous couples may have more misunderstandings and conflicts due to their differences in cultural background (Kuroki 2017; Zhang and Van Hook 2009). The higher propensity for marital dissolution in this particular family setting could help explain the generational gradient.

According to previous research, the mother's mental health is likely to influence a number of her children's outcomes, including their psychiatric health (Priel et al. 2018), behavior in school, academic achievement, and school attendance (Claessens et al. 2015). This influence has been observed at different stages of the life course, starting with *in utero* exposure to maternal depression (Suri et al. 2014). Some of the mechanisms that explain the relationship between maternal mental health and children's outcomes include the genetic propensity for depression; innate dysfunctional neurobiological mechanisms; exposure to negative maternal cognitions, behaviors, and affect; and exposure to chronic stress (de Castro et al. 2017); or a combination thereof (Bouvette-Turcot et al. 2017). Immigrants are at particular risk of developing mental health problems in all migration phases. After they arrive in the receiving country, immigrants are likely to face integration issues and to have low socioeconomic status and poor working conditions (Lindert et al. 2008). All these factors are associated with an increased risk of developing mental health problems. Here, we focus on maternal mental health as a predictor of children's outcomes because disorders such as depression are twice as likely to occur in women as in men (Claessens et al. 2015; Kessler et al. 2003).

Characteristics of the Population With a Migration Background and Their Access to the Finnish Healthcare System

According to Statistics Finland,[3] the foreign-born population in Finland has tripled in the last 20 years, from around 150,000 individuals in 2001 to around 400,000 indi-

[3] https://www.stat.fi/tup/maahanmuutto/maahanmuuttajat-vaestossa/ulkomailla-syntyneet_en.html

viduals in 2019, a figure that represents around 7.3% of the total population. Thus, although the immigrant population in Finland is still relatively small in absolute numbers, it is increasing very rapidly. According to our calculations based on the total Finnish population register, the most numerous groups of immigrants by country of birth living in the country were born in the former Soviet Union, including Estonia and the Russian Federation, and Sweden and Iraq. Together with an increase in the immigrant population, Finland has experienced an increase in the rate of marriage between one Finnish and one immigrant partner, with the rate doubling in the last decade alone.[4] Our calculations show that the largest shares of Finnish women in exogamous marriages are married to men born in Sweden (28% among all women married to immigrant men), the United Kingdom (5.2%), Turkey (4.7%), and Germany (4.2%); the largest shares of Finnish men in exogamous marriages are married to women born in Sweden (41.3% among all men married to immigrant women), countries from the former Soviet Union (27.3%), Thailand (3.8%), and the Philippines (2.4%).

All permanent residents of Finland, irrespective of their citizenship and country of birth, have access to publicly funded healthcare with low out-of-pocket expenses (Mölsä et al. 2019). European Union (EU) residents with the European Health Insurance Card (EHIC) are given free treatment because of their status as EU residents. Finland ranks second in the world—together with three other countries—on the Healthcare Access and Quality Index (Fullman et al. 2018). However, although the Finnish healthcare system guarantees equal access in principle, having limited knowledge, scarce financial resources, and language barriers may limit people's access in practice (Van Doorslaer et al. 2006). Because Finland has experienced increases in the foreign-born population and in the number of exogamous families and has a universal healthcare system that in principle guarantees equal access to immigrants, it is an ideal setting for studying generational gradients in the health outcomes of immigrant children.

Data

The study data are derived from various Finnish register data files covering the 1986–2000 birth cohorts. These include data from the population register maintained by Statistics Finland (which contains the sociodemographic data) and from the hospital discharge register; National Institute for Health and Welfare data on the use of specialized outpatient services; and data from the medication purchases register maintained by the Social Insurance Institution. The data cover all children aged 0–14 at the end of 2000. The data do not suffer from nonresponse or reporting bias. Of the children in our sample, 99% had full follow-ups from age 10 to age 18. The remaining 8,604 individuals contributed 25,909 missing person-years, which could be due to death, out-migration, or temporary stays abroad. Among these individuals, 1,318 died during the follow-up, and 1,139 first arrived in Finland after age 10. The rest of these individuals contributed missing person-years due to out-migration. If out-migration is selective and correlated with health, it may influence our results. Although it is difficult to analyze the magnitude of this potential problem because data on health after

[4] https://www.stat.fi/tup/maahanmuutto/perheet/solmitut-avioliitot_en.html

out-migration are not available, the bias is likely to be small because of the small volume of out-migration.

The data set contains annually updated individual-level information on all household members and all nonresident biological and adoptive parents of the 0- to 14-year-olds. The sample has been linked to healthcare data, which are used to assess health outcomes. We include in our analysis all the children who were aged 10–18 between December 31, 1996, and December 31, 2016 (N=933,072 individuals and 8,197,381 person-years). We follow these children from 1987 until the end of 2017, the year for which the most recent health information is available. We use person-years as observations, and we exclude all person-years for which no maternal information is available (excluding 6,972 individuals and 93,924 person-years). Finally, we exclude all person-years in which the children are not residing in households (3,813 individuals and 88,413 person-years). The final sample size is 8,015,044 person-years contributed by 922,287 children.

Key Measures

Our key outcomes consist of inpatient and specialized outpatient care records. These records are classified according to the ICD-10 classification as somatic conditions (ICD10 codes A00-N99, P00-Q99), psychopathological disorders (ICD10 codes F20-F69, F80-F99), injuries (ICD10 codes S00-S99, T00-T14), and any disorder (any of the aforementioned). The group of somatic conditions includes all types of conditions, such as cancer, severe infections, asthma, epilepsy, and type 1 diabetes (but excluding pregnancy-related diagnoses, undefined symptoms, and accidents). The category of mental disorders includes any psychopathology, such as mental and behavioral disorders due to psychoactive substance use, mood/affective disorders, neurotic syndromes, behavioral and emotional disorders, and disorders of psychological development (but excluding organic mental disorders and mental retardation). The injuries category covers all types of injuries, including burns, poisoning, and toxic effects of substances. Inpatient care data are available from 1970 to 2017, but outpatient data are available from 1998 to 2017 only. The data are structured in such a way that the individual's background information at the end of the preceding year predicts his/her health outcomes during the next year. Because our analyses are limited to children aged 10–18, the children of the 1986 cohort have one year less of outpatient data. We restrict our analyses to the 10–18 age group following the WHO definition of adolescence. Adolescence is a critical time of life. It is a phase when people become independent individuals, forge new relationships, develop social skills, and learn behaviors that will last for the rest of their lives. Moreover, as young people undergo the profound neurological, physical, and emotional changes that characterize the transition from childhood to adulthood, they face a range of health risks.[5]

Individuals who were born outside Finland are defined as immigrants. The information on the parents' immigrant background and the child's place of birth is used to distinguish members of the immigrant generation—our key predictor—from natives. The immigrant generation is defined using the following categories: (1) *native* chil-

[5] https://www.who.int/health-topics/adolescent-health#tab=tab_1

dren are children born in Finland to native parents and children born abroad to native parents (reference category); (2) *first-generation immigrant* children are children born abroad whose parents were born abroad; (3) *second-generation* children are children born in Finland whose parents were born abroad; and (4) *2.5-generation* children are children born to one native and one immigrant parent. Children of the 2.5 generation are divided into those who have an immigrant mother and those who have an immigrant father. The 2.5 generation also includes children born abroad to exogamous families (3.7% of all children with an immigrant background). Children born abroad to native parents are defined as *natives*. All children with maternal information are included in the sample. Children with missing paternal information are classified by generation based on maternal information only. To account for missing fathers, we adjust all analyses with a dummy indicator of no paternal information in the data. Missing paternal information makes it difficult to determine how many children of the first generation were living in exogamous families. In this specific case, a child living in an exogamous family could have a Finnish father but with missing information. However, as Table 2 shows, the percentage of cases with missing information in which the father is a native is small. Thus, it is unlikely that the missing information refers to a Finnish father, and we are confident that the level of misclassification error in such cases is low. Similar misclassification errors might occur among children of natives and second-generation children when paternal information is missing.

The information available in the linked data set used in the analyses as a control includes (1) sex of the child (measured at baseline) as well as (2) age of the child (10–18 years, categorical, one-year groups), and (3) area of residence (Helsinki and Uusimaa hospital district [capital area] vs. other districts), both of which are time-varying and measured at the end of the preceding year. To analyze the impact of family characteristics on the generational gradient of health as well as the role exogamous families play in the health assimilation process, we include controls for (1) the biological mother's age at the time of childbirth (younger than 26, 26–30, or older than 30); (2) the mother's educational level (no secondary education, secondary education, or tertiary education); (3) household consumable income, both of which are time-varying and measured at the end of the preceding year; (4) *family stability*, defined as living in a two-parent family versus in other settings, which is time-varying and measured at the end of preceding year, and depending on whether the biological parents divorced before age 10; (5) the mother's mental health, as indicated by inpatient and outpatient care for psychopathological disorders (ICD9 [1987–1996]: 295–302, 307, 309, 310, 312, and 316; ICD10 [1996–2011]: F20–F69 and F99), and measured before the child turned age 10; and (6) mother's purchase of psychotropic medications (ATC: N05–N07, excluding N07B), which is time-varying, and measured as one-year lagged during the follow-up.

Empirical Approach

We pool all the person-years and apply logistic regressions, with standard errors clustered by each individual, to account for the violation of nonindependence between observations.

We estimate three models for each of the outcomes. In Model 1, we describe the generational gradient, controlling for age (reference = 10 years of age), missing

information on the father (reference = no vs. yes), sex (reference = male), and area of residence of the children (reference = other vs. Helsinki area). In Model 2, we also include the background characteristics of the parents and the family—mother's age at childbearing (reference = younger than 26), mother's education (reference = tertiary level), and household income (reference = highest tertile)—to analyze to what extent these factors account for the generational gradient. In Model 3, we include the controls of Models 1 and 2, as well as living in a two-parent family (reference = no), the parents divorced before the child turned 10 (reference = no vs. yes), and the mother's mental health (reference = no vs. yes for both indicators) to assess the effects of potential stressors on the gradient.

Results

Individuals with an immigrant background contribute 486,809 person-years, or 6.1% of the total study population (Table 1). Of the children with an immigration background, 17.5% belong to the first generation, 15.8% belong to the second generation, and around 65% come from an exogamous family. In roughly one-half of these cases, the child has an immigrant mother and a native father; in the other one-half, the child has an immigrant father and a native mother.

Descriptive statistics of the analytical sample are described in Table 2. The share of cases in which there is missing information for the father is low for native children (1%), is slightly higher for second-generation children (3.6%), and is relatively high for first-generation children (24.5%).

Large shares of the children of immigrants live in the capital area (Helsinki and Uusimaa), especially children of the first (50%) and second generations (65%); children of natives are more likely to live in other areas (75%). Mothers of first- and second-generation children are, on average, less educated than native mothers: 44% of native mothers have a tertiary degree compared with 24% of mothers of the first generation and 18% of mothers of the second generation. However, the educational differences between natives and immigrants are less pronounced in cases in which an immigrant mother is married to a native man. Household income tends to be far lower in immigrant families than in native families, and especially in families of first- and second-generation children. The proportion of families in the highest income tertile is 9% for those with first-generation children, 11% for those with second-generation children, and 36% for those with native children. The native-immigrant differential is smaller for families with 2.5-generation children (~28 irrespective of which parent is an immigrant). Parents of the second and 2.5 generations have a higher risk of divorcing before their child's 10th birthday than parents of the first generation and natives. Immigrant mothers are, on average, younger than Finnish mothers, and especially those of first-generation children. Native mothers are, on average, older than immigrant mothers, irrespective of the migration background of the husband. Whereas the proportion of children living in a two-parent household is highest in native families, the native-immigrant differential is smaller in families with first-generation children (69%) and with 2.5-generation children when the mother is an immigrant (71%). Mothers of immigrant children receive care for psychopathological disorders and use psychiatric medications more frequently than mothers of native children.

Table 1 Absolute and percentage distributions of the target population (N = person-years): Prevalence (%), and 95% confidence intervals (in parentheses) of the selected health outcomes, by immigrant background and generation, for individuals aged 10–18 (proportion of person-years with outcomes during follow-up)

	Population Size		Percentage of Person-Years Receiving Care by Selected Outcomes			
	N	%	Any	Somatic	Psychopathology	Injury
Native Population	7,528,235	93.9	18.2 (18.1–18.2)	12.7 (12.7–12.8)	3.3 (3.3–3.4)	3.8 (3.8–3.9)
Population With Immigrant Background	486,809	6.1	18.5 (18.3–18.6)	12.3 (12.2–12.4)	4.1 (4.1–4.2)	4.0 (3.9–4.0)
Total		100.0				
Among the Population With Immigrant Background						
First generation	85,165	17.5	14.5 (14.3–14.8)	10.0 (9.8–10.2)	2.5 (2.4–2.6)	3.3 (3.2–3.4)
Second generation	76,669	15.8	17.8 (17.6–18.1)	12.8 (12.5–13.0)	3.0 (2.9–3.1)	3.7 (3.6–3.8)
2.5-generation immigrant mother and native father	152,855	31.4	19.0 (18.8–19.2)	12.6 (12.4–12.8)	4.3 (4.2–4.4)	4.2 (4.1–4.3)
2.5-generation immigrant father and native mother	172,120	35.4	20.2 (20.0–20.4)	13.1 (19.2–13.2)	5.2 (5.1–5.3)	4.2 (4.1–4.3)
Total		100.0				

The Generational Gradient

The adjusted odds ratios (ORs) and the 95% confidence intervals (CIs) for the four health outcomes associated with immigrant generation are presented in Figure 1 (any cause of treatment) and Figure 2 (inpatient and outpatient care for psychopathological disorders, somatic conditions, and injuries). The full models are also included in Tables 3, 4, 5, and 6.

Figure 1 shows the generational gradient on any treatment cause (full model estimates in Table 3). In Model 1, we observe a clear pattern of increasing odds of receiving care for any of the three causes over the immigrant generations. Compared with natives, first-generation immigrants have lower odds of receiving care, which reflects the selective nature of migration (OR = 0.73, CI = 0.70–0.75). For second-generation immigrants, the OR does not differ significantly from that of natives (OR = 0.97, CI = 0.94–1.00). However, 2.5-generation children with an immigrant mother and 2.5-generation children with an immigrant father have higher odds of receiving treatment for any cause compared with natives (respectively, OR = 1.06, CI = 1.04–1.08; OR = 1.14, CI = 1.12–1.16).

In Model 2 (Table 3), we test for demographic and socioeconomic characteristics of the family as potential explanatory factors of the generational gradient. We include the mother's age at childbirth, a dummy variable for missing paternal information, maternal education, and household income. Controlling for these demographic and socioeconomic mechanisms does not account for the generational gradient: the slope of this

Table 2 Absolute and percentage distributions of individual characteristics of children by immigrant background (N = person-years)

	Total Population		Natives		First Generation	Second Generation	2.5-Generation Immigrant Mother	2.5-Generation Immigrant Father
	N	%	*N*	%	%	%	%	%
Data on Father Missing	104,486	1.3	80,838	1.1	24.5	3.6	0.0	0.0
Female	3,923,975	49,0	3,686,129	49.0	49.4	49.3	48.4	48.8
Helsinki and Uusimaa Area	2,138,121	26.7	1,918,621	25.5	49.2	65.6	32.9	44.8
Mother's Education								
Basic (less than secondary)	1,063,291	13.3	923,425	12.3	49.9	50.7	24.4	12.3
Secondary	3,465,660	43.2	3,287,558	43.7	26.5	30.8	40.2	40.9
Tertiary	3,486,093	43.5	3,317,252	44.1	23.6	18.5	35.4	46.8
Income Tertiles								
Lowest	2,379,966	29.7	2,145,126	28.5	72.9	66.0	36.6	38.5
Secondary	2,807,703	35.0	2,665,110	35.4	18.4	22.8	34.0	33.4
Highest	2,827,375	35.3	2,717,999	36.1	8.7	11.2	29.4	28.1
Parents Divorced	906,196	11.3	830,527	11.0	4.7	16.2	16.9	19.4
Two-Parent Family	6,194,924	77.3	5,863,422	77.9	69.5	67.1	71.7	64.7
Mother's Age at Childbirth								
<26	1,909,638	23.8	1,738,667	23.1	52.9	36.3	33.9	26.9
26–30	2,917,117	36.4	2,758,323	36.6	27.8	33.1	34.4	33.2
>30	3,188,289	39.8	3,031,245	40.3	19.3	30.6	31.7	39.9
Mother's Health								
Psychiatric hospitalization	152,645	1.9	142,970	1.9	1.2	1.8	2.3	2.2
Psychiatric medication prescription	1,088,490	13.6	1,024,547	13.6	9.4	10.7	13.6	15.6

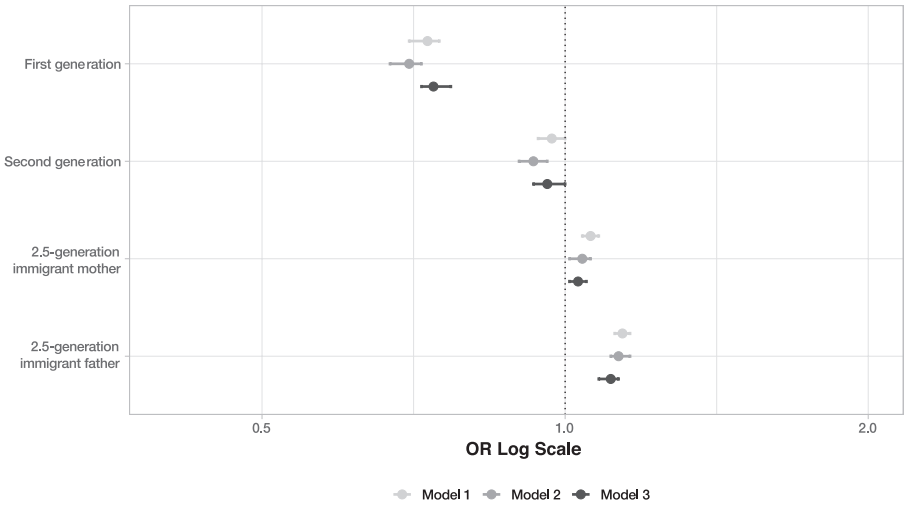

Fig. 1 The generational gradient on any inpatient and outpatient care cause. Odds ratios (OR) are estimated with logistic regression, with robust standard errors clustered by individuals (ref. = children of native-born parents), plotted on a log scale. Model 1 is adjusted for child's age, sex, area of residence, and missing data on the father. Model 2: Model 1 + mother's age at childbearing, mother's education, and household income. Model 3: Model 2 + living in a two-parent family, parents divorced before the child's 10th birthday, and mother's mental health.

gradient does not change from Model 1 to Model 2, although it shifts to the left. This finding means that the coefficients decrease slightly, which in turn implies that for first-generation children, whose parents are, on average, less educated than native parents, controlling for this socioeconomic disadvantage decreases the odds. Compared with the children of younger mothers (<26 years old), the children of mothers aged 26+ have lower odds of receiving inpatient and outpatient care. Mother's education and household income do not seem to have a strong relationship with any of the outcomes (Table 3).

In Model 3 (Table 3), we analyze whether controlling for potential stressors can explain the generational gradient. These controls include family stability (parents divorced before the child's 10th birthday and whether the child lives in a two-parent family during follow-up) and mother's mental health problems (annual use of psychotropic medication during follow-up and inpatient and outpatient care for psychopathological disorders before the child's 10th birthday). All the mechanisms tested in Model 3 slightly attenuate the slope of the gradient but do not fully explain this generational pattern. Living in a two-parent family is associated with decreased odds of receiving care, whereas parental divorce before the child's 10th birthday is positively associated with poor health. Children whose parents divorced have higher odds of receiving treatment than children who did not experience this stressful event. Both indicators of the mother's mental health condition are associated with a higher odds of poor health.

To test for different mechanisms operating on the generational gradient depending on the outcome, we apply the same analytic procedure to inpatient and outpatient care by cause (psychopathological disorders, somatic conditions, and injuries). We find that

Table 3 Inpatient and outpatient care for any of the three causes: Odds ratios estimated with logistic regression, with robust standard errors clustered by individuals, and 95% confidence intervals (CI)

	Model 1			Model 2			Model 3		
	OR	95% CI		OR	95% CI		OR	95% CI	
Generation (ref. = native)									
First	0.73	0.70	0.75	0.70	0.67	0.72	0.74	0.72	0.77
Second	0.97	0.94	1.00	0.93	0.90	0.96	0.96	0.93	1.00
2.5-immigrant mother, native father	1.06	1.04	1.08	1.04	1.01	1.06	1.03	1.01	1.05
2.5-immigrant father, native mother	1.14	1.12	1.16	1.13	1.11	1.16	1.11	1.08	1.13
Age (ref. = 10)									
11	1.12	1.11	1.12	1.12	1.11	1.12	1.11	1.10	1.12
12	1.14	1.13	1.15	1.14	1.14	1.15	1.13	1.13	1.14
13	1.25	1.24	1.26	1.25	1.24	1.26	1.23	1.23	1.24
14	1.44	1.43	1.45	1.44	1.43	1.45	1.43	1.42	1.44
15	1.50	1.49	1.51	1.50	1.49	1.51	1.48	1.46	1.49
16	1.43	1.42	1.44	1.43	1.42	1.44	1.39	1.38	1.40
17	1.44	1.43	1.45	1.44	1.43	1.45	1.40	1.39	1.41
18	1.44	1.43	1.45	1.44	1.43	1.45	1.38	1.37	1.39
Sex (ref. = male)									
Female	0.99	0.98	1.00	0.99	0.98	1.00	0.99	0.98	0.99
Area (ref. = other)									
Helsinki and Uusimaa	1.02	1.01	1.03	1.03	1.02	1.04	1.00	1.00	1.01
Missing Information on the Father in the Data	1.19	1.16	1.23	1.16	1.13	1.19	1.09	1.06	1.12
Mother's Education (ref. = tertiary)									
No secondary				1.09	1.08	1.10	1.08	1.07	1.09
Secondary				1.04	1.04	1.05	1.05	1.04	1.06
Household Income Tertile (ref. = highest)									
Lowest				1.00	0.99	1.01	0.90	0.89	0.90
Middle				1.03	1.02	1.04	0.99	0.99	1.00
Mother's Age at Childbirth (ref. = <26)									
26–30				0.92	0.91	0.92	0.91	0.91	0.92
>30				0.91	0.90	0.92	0.90	0.89	0.91
Child Lives in a Two-Parent Family (ref. = no)							0.82	0.82	0.83
Mother Divorced Before Child's 10th Birthday (ref. = no)							1.07	1.06	1.08
Mother Hospitalized Before Child's 10th Birthday (ref. = no)							1.13	1.10	1.15
Mother Purchased Psychotropic Medications (ref. = no)							1.32	1.31	1.33

Notes: Number of observations = 8,015,044. Number of clusters = 922,287.

the generational gradient is particularly clear and strong for the mental health of children (see Figure 2; full model estimates in Table 4). Compared with native children, children of the first generation and children of the second generation have lower odds of receiving treatment for psychopathological disorders (OR = 0.56, CI = 0.52–0.61 for first-generation children; OR = 0.74, CI = 0.69–0.80 for second-generation children)—a result that suggests that the selectivity of families in terms of mental health persists into both the first and the second generation. Children of exogamous families have higher odds of having psychopathological disorders compared with children of

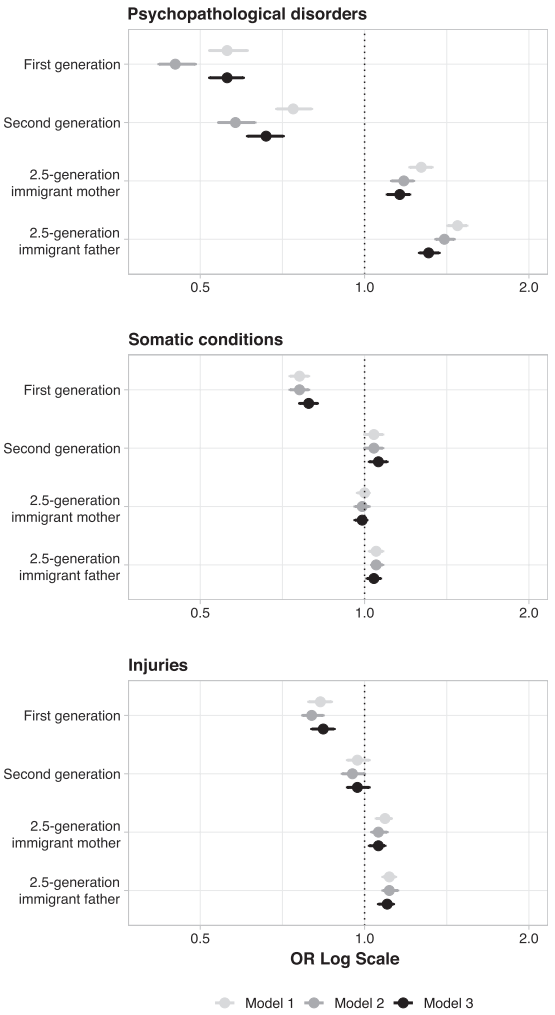

Fig. 2 The generational gradient on inpatient and outpatient care for psychopathological disorders, somatic conditions, and injuries. Odds ratios (OR) are estimated with logistic regression, with robust standard errors clustered by individuals (ref. = children of native-born parents), plotted on a log scale. Model 1 is adjusted for child's age, sex, area of residence, and missing data on the father. Model 2: Model 1 + mother's age at childbearing, mother's education, and household income. Model 3: Model 2 + living in a two-parent family, parents divorced before the child's 10th birthday, and mother's mental health.

natives, especially when the immigrant parent is the father (OR = 1.48, CI = 1.42–1.54) but also when the immigrant parent is the mother (OR = 1.27, CI = 1.21–1.33).

In Model 2 (Table 4), we test for the role of the demographic and socioeconomic characteristics of the family on children's odds of receiving inpatient and outpatient care for psychopathological disorders. Although the magnitude of these associations is shown to be substantial, the set of variables included in Model 2 does not explain the observed generational pattern for psychopathological disorders. Again, as observed for any cause, the coefficients decrease in magnitude, but the slope of the gradient does not

change. We further observe that psychopathological disorders are strongly linked to demographic and socioeconomic background characteristics. Children of mothers with low education and children of families with low income have significantly higher odds of receiving care. Specifically, we find that children of mothers with less than secondary education have an OR equal to 1.50 (CI = 1.47–1.52) compared with children of better educated mothers and that children of families with the lowest income have an OR equal to 1.10 (CI = 1.08–1.11) compared with children of higher-income families. Compared with young maternal age, advanced maternal age is found to be associated with decresead odds of inpatient and outpatient care for children.

In Model 3 (Table 4), we test for stressor mechanisms, such as family stability and the mother's mental health. The OR for receiving care for mental health problems is 1.31 (CI = 1.26–1.37) for children born to exogamous families with an immigrant father and 1.16 (CI = 1.10–1.21) for children born to such families with an immigrant mother compared with native children. The stressor mechanisms are strongly associated with children's mental health and have the expected signs: children living in a two-parent household have an OR of receiving care for mental health problems equal to 0.61 (CI = 0.60–0.62), whereas for children of divorced parents, the OR is equal to 1.26 (CI = 1.24–1.29). Maternal mental health is also a strong predictor of children's mental health outcomes. In particular, when the mother uses psychotropic medications, the OR for her children receiving care is more than doubled.

The likelihood of receiving care for somatic conditions (Figure 2; full model estimates in Table 5) seems to be less related to immigrant generation than to the presence of psychopathological disorders. For somatic conditions, the OR of receiving care for first-generation children is equal to 0.76 (CI = 0.73–0.79). However, we do not observe a full generational gradient. This result seems to reflect the selective nature of migration that characterizes the first generation and the negative health assimilation of the second generation. Furthermore, the mechanisms tested in Models 2 (demographic characteristics and socioeconomic conditions of the family) and Model 3 (stressors) in Table 5 do not seem to be linked to the odds of receiving inpatient and outpatient care for somatic conditions. An exception to this observed pattern is the maternal use of psychotropic medications, for which we observe an OR of receiving care equal to 1.20 (CI = 1.19–1.21).

In the case of injuries (Figure 2; full model estimates in Table 6), we again observe in Model 1 decreased odds of poor outcomes for immigrant children of the first generation. Children of the 2.5 generation with an immigrant father have slightly higher odds of receiving care for injuries than natives (OR = 1.11, CI = 1.08–1.14). In Models 2 and 3 (Table 6), the coefficients of the generational gradient are not affected by the tested mechanisms.

Region of Origin

As a final step, we include the immigration background of the child in the models (see Table 7). Our results show that for any cause, children of generation 2.5 who have a parent who immigrated from Africa or a father who immigrated from Asia have the highest odds of receiving care. They are followed by children of the second generation who have a parent from the Americas. The OR for receiving inpatient and

Table 4 Inpatient and outpatient care for psychopathological disorders: Odds ratio estimated, with logistic regression with robust standard errors clustered by individuals, and 95% confidence intervals (CI)

	Model 1			Model 2			Model 3		
	OR	95% CI		OR	95% CI		OR	95% CI	
Generation (ref. = native)									
First	0.56	0.52	0.61	0.45	0.42	0.49	0.56	0.52	0.60
Second	0.74	0.69	0.80	0.58	0.54	0.63	0.66	0.61	0.71
2.5-immigrant mother, native father	1.27	1.21	1.33	1.18	1.12	1.23	1.16	1.10	1.21
2.5-immigrant father, native mother	1.48	1.42	1.54	1.40	1.35	1.46	1.31	1.26	1.37
Age (ref. = 10)									
11	1.04	1.03	1.06	1.05	1.03	1.06	1.03	1.02	1.05
12	1.16	1.14	1.18	1.16	1.15	1.18	1.13	1.12	1.15
13	1.45	1.43	1.47	1.47	1.45	1.49	1.41	1.39	1.43
14	1.85	1.82	1.88	1.83	1.81	1.86	1.78	1.75	1.81
15	2.10	2.07	2.14	2.10	2.06	2.13	2.00	1.96	2.03
16	2.20	2.17	2.24	2.21	2.17	2.25	2.06	2.02	2.09
17	2.23	2.19	2.27	2.23	2.20	2.27	2.04	2.00	2.07
18	2.08	2.04	2.11	2.06	2.02	2.09	1.80	1.77	1.83
Sex (ref. = male)									
Female	1.26	1.25	1.28	1.26	1.24	1.28	1.26	1.24	1.27
Area (ref. = other)									
Helsinki and Uusimaa	1.56	1.53	1.58	1.66	1.64	1.69	1.53	1.51	1.55
Missing Information on the Father in the Data	1.77	1.69	1.87	1.55	1.48	1.63	1.37	1.30	1.44
Mother's Education (ref. = tertiary)									
No secondary				1.24	1.21	1.26	1.20	1.17	1.22
Secondary				1.10	1.08	1.11	1.11	1.10	1.13
Household Income Tertile (ref. = highest)									
Lowest				1.50	1.47	1.52	1.07	1.06	1.09
Middle				1.24	1.22	1.26	1.10	1.09	1.12
Mother's Age at Childbirth (ref. = <26)									
26–30				0.82	0.81	0.84	0.82	0.80	0.83
>30				0.88	0.87	0.90	0.85	0.83	0.86
Child Lives in a Two-Parent Family (ref. = no)							0.61	0.60	0.62
Mother Divorced Before Child's 10th Birthday (ref. = no)							1.26	1.24	1.29
Mother Hospitalized Before Child's 10th Birthday (ref. = no)							1.42	1.36	1.47
Mother Purchased Psychotropic Medications (ref. = no)							2.07	2.04	2.10

Notes: Number of observations = 8,015,044. Number of clusters = 922,287.

outpatient care for somatic conditions is particularly high for children in exogamous families with a parent born in Africa or with a father born in Asia, as well as for children of the second generation with a parent born in the Americas or in Asia. Children of the 2.5 generation with an immigrant father have the greatest odds of becoming injured and developing psychopathological disorders, irrespective of the region of origin. Among the other children who have particularly high odds of having psychopathological conditions are those of the 2.5 generation with an Asian or a European mother and those of the second generation with an American background. At the

Table 5 Inpatient and outpatient care for somatic conditions: Odds ratios estimated with logistic regression, with robust standard errors clustered by individuals, and 95% confidence intervals (CI)

	Model 1			Model 2			Model 3		
	OR	95% CI		OR	95% CI		OR	95% CI	
Generation (ref. = native)									
First	0.76	0.73	0.79	0.76	0.73	0.79	0.79	0.76	0.82
Second	1.04	1.00	1.08	1.04	1.00	1.08	1.06	1.02	1.10
2.5-immigrant mother, native father	1.00	0.97	1.02	0.99	0.96	1.02	0.99	0.96	1.01
2.5-immigrant father, native mother	1.05	1.02	1.08	1.05	1.03	1.08	1.04	1.01	1.07
Age (ref. = 10)									
11	1.10	1.09	1.10	1.10	1.09	1.10	1.09	1.09	1.10
12	1.09	1.08	1.10	1.09	1.08	1.10	1.08	1.07	1.09
13	1.16	1.15	1.17	1.16	1.15	1.17	1.15	1.14	1.16
14	1.30	1.29	1.31	1.30	1.29	1.31	1.29	1.28	1.30
15	1.33	1.32	1.34	1.33	1.32	1.34	1.31	1.30	1.32
16	1.26	1.25	1.27	1.26	1.25	1.27	1.24	1.23	1.25
17	1.27	1.26	1.28	1.27	1.26	1.28	1.25	1.24	1.26
18	1.28	1.27	1.29	1.28	1.27	1.29	1.25	1.24	1.26
Sex (ref. = male)									
Female	1.11	1.10	1.11	1.11	1.10	1.12	1.11	1.10	1.12
Area (ref. = other)									
Helsinki and Uusimaa	0.92	0.91	0.92	0.92	0.91	0.92	0.90	0.89	0.91
Missing Information on the Father in the Data	1.08	1.04	1.12	1.08	1.04	1.11	1.04	1.00	1.07
Mother's Education (ref. = tertiary)									
No secondary				1.06	1.05	1.07	1.05	1.04	1.07
Secondary				1.04	1.03	1.05	1.04	1.04	1.05
Household Income Tertile (ref. = highest)									
Lowest				0.94	0.93	0.95	0.88	0.87	0.89
Middle				1.01	1.00	1.02	0.99	0.98	1.00
Mother's Age at Childbirth (ref. = <26)									
26–30				0.95	0.94	0.96	0.95	0.94	0.96
>30				0.95	0.94	0.96	0.94	0.93	0.95
Child Lives in a Two-Parent Family (ref. = no)							0.89	0.89	0.90
Mother Divorced Before Child's 10th Birthday (ref. = no)							1.02	1.01	1.04
Mother Hospitalized Before Child's 10th Birthday (ref. = no)							1.04	1.01	1.07
Mother Purchased Psychotropic Medications (ref. = no)							1.20	1.19	1.21

Notes: Number of observations = 8,015,044. Number of clusters = 922,287.

opposite end of the generational continuum, children of the first generation generally have lower odds of experiencing all outcomes, irrespective of their region of origin.

Sensitivity Analyses

We run several sensitivity analyses to ensure the robustness of our results. The results of these analyses are provided in the online appendix. First, we run the analyses stratified by sex and find no notable differences.

Table 6 Inpatient and outpatient care for injuries: Odds ratios estimated with logistic regression, with robust standard errors clustered by individuals, and 95% confidence intervals (CI)

	Model 1			Model 2			Model 3		
	OR	95% CI		OR	95% CI		OR	95% CI	
Generation (ref. = native)									
First	0.83	0.79	0.87	0.80	0.77	0.84	0.84	0.80	0.88
Second	0.97	0.93	1.02	0.95	0.91	1.00	0.97	0.93	1.02
2.5-immigrant mother, native father	1.09	1.05	1.12	1.06	1.03	1.10	1.06	1.02	1.09
2.5-immigrant father, native mother	1.11	1.08	1.14	1.11	1.08	1.15	1.10	1.06	1.13
Age (ref. = 10)									
11	1.22	1.20	1.24	1.22	1.20	1.24	1.22	1.20	1.24
12	1.34	1.31	1.36	1.33	1.31	1.36	1.33	1.31	1.35
13	1.44	1.42	1.47	1.44	1.42	1.47	1.43	1.41	1.46
14	1.70	1.68	1.73	1.71	1.68	1.74	1.70	1.68	1.73
15	1.74	1.71	1.77	1.74	1.72	1.77	1.73	1.70	1.76
16	1.57	1.54	1.60	1.57	1.55	1.60	1.55	1.53	1.58
17	1.55	1.53	1.58	1.56	1.53	1.58	1.53	1.50	1.56
18	1.64	1.61	1.66	1.64	1.61	1.67	1.60	1.57	1.62
Sex (ref. = male)									
Female	0.60	0.59	0.60	0.60	0.59	0.60	0.60	0.59	0.60
Area (ref. = other)									
Helsinki and Uusimaa	0.99	0.98	1.00	0.99	0.98	1.00	0.97	0.96	0.98
Missing Information on the Father in the Data	1.11	1.07	1.16	1.10	1.05	1.14	1.04	1.00	1.09
Mother's Education (ref. = tertiary)									
No secondary				1.08	1.06	1.10	1.08	1.06	1.09
Secondary				1.02	1.01	1.03	1.03	1.02	1.04
Household Income Tertile (ref. = highest)									
Lowest				0.91	0.90	0.92	0.84	0.83	0.85
Middle				0.97	0.96	0.98	0.94	0.93	0.95
Mother's Age at Childbirth (ref. = <26)									
26–30				0.90	0.89	0.91	0.90	0.88	0.91
>30				0.83	0.82	0.84	0.83	0.82	0.84
Child Lives in a Two-Parent Family (ref. = no)							0.85	0.84	0.86
Mother Divorced Before Child's 10th Birthday (ref. = no)							1.04	1.02	1.05
Mother Hospitalized Before Child's 10th Birthday (ref. = no)							1.04	1.01	1.07
Mother Purchased Psychotropic Medications (ref. = no)							1.07	1.06	1.08

Notes: Number of observations = 1,227,286. Number of clusters = 184,262.

Second, we focus separately on inpatient and outpatient treatments. Our measure of inpatient and outpatient care includes treatment of acute, severe cases in hospital wards, as well as routine treatment of low-severity cases (e.g., allergy tests). By definition, outpatient treatments are for less severe cases than inpatient care. For this reason, we run our models separately to disentangle whether the relationship between immigrant generations is affected by the severity of the case. These results show no notable differences in the generational gradients observed for inpatient and outpatient care separately (results provided in the online appendix).

Table 7 Inpatient and outpatient care for selected outcomes, including region of origin of the immigrant parent(s): Odds ratio estimated with logistic regression with robust standard errors clustered by individuals, and 95% confidence intervals (CI)

	Any Cause			Psychopathologies			Somatic Conditions			Injuries		
	OR	95% CI		OR	95% CI		OR	95% CI		OR	95% CI	
Generation (ref. = native)												
First generation from Europe	0.71	0.68	0.74	0.58	0.53	0.64	0.73	0.69	0.77	0.82	0.78	0.87
First generation from the Americas	0.61	0.40	0.93	0.54	0.25	1.15	0.75	0.47	1.17	0.50	0.26	0.99
First generation from Asia	0.79	0.75	0.84	0.54	0.46	0.62	0.86	0.80	0.93	0.86	0.78	0.94
First generation from Africa	0.79	0.72	0.87	0.44	0.35	0.55	0.93	0.83	1.04	0.84	0.73	0.98
Second generation from Europe	1.01	0.97	1.06	0.79	0.71	0.87	1.05	0.99	1.11	1.10	1.04	1.17
Second generation from the Americas	1.16	0.87	1.54	1.11	0.62	1.97	1.22	0.87	1.70	0.87	0.56	1.34
Second generation from Asia	0.95	0.89	1.01	0.66	0.57	0.75	1.09	1.02	1.17	0.80	0.73	0.88
Second generation from Africa	0.86	0.80	0.92	0.38	0.32	0.46	1.03	0.95	1.12	0.90	0.82	1.00
2.5-generation mother from Europe	1.06	1.03	1.08	1.16	1.10	1.22	1.02	0.99	1.05	1.09	1.05	1.12
2.5-generation mother from the Americas	0.89	0.81	0.99	0.98	0.80	1.21	0.83	0.74	0.94	0.99	0.87	1.14
2.5-generation mother from Asia	0.86	0.79	0.92	1.18	1.03	1.35	0.77	0.70	0.85	0.84	0.75	0.94
2.5-generation mother from Africa	1.16	0.97	1.38	0.98	0.69	1.41	1.28	1.04	1.57	0.88	0.68	1.14
2.5-generation father from Europe	1.08	1.05	1.11	1.29	1.22	1.36	1.01	0.97	1.04	1.10	1.06	1.14
2.5-generation father from the Americas	1.04	0.96	1.12	1.29	1.11	1.49	0.94	0.85	1.03	1.14	1.03	1.27
2.5-generation father from Asia	1.14	1.08	1.21	1.36	1.23	1.50	1.10	1.03	1.18	1.05	0.96	1.13
2.5-generation father from Africa	1.19	1.13	1.25	1.32	1.20	1.44	1.13	1.06	1.20	1.08	1.00	1.16
Mother's Education (ref. = tertiary)												
Basic	1.08	1.07	1.09	1.20	1.17	1.22	1.05	1.04	1.06	1.08	1.06	1.09
Secondary	1.04	1.04	1.05	1.11	1.09	1.13	1.04	1.03	1.05	1.02	1.01	1.03
Income (ref. = highest tertile)												
Middle	0.99	0.98	1.00	1.10	1.08	1.11	0.99	0.98	0.99	0.94	0.93	0.95
Lowest	0.89	0.88	0.90	1.07	1.05	1.09	0.88	0.87	0.89	0.84	0.83	0.85
Mother's Age at Childbirth (ref. = <26)												
26–30	0.91	0.90	0.92	0.81	0.80	0.83	0.94	0.93	0.95	0.89	0.88	0.90
>30	0.90	0.89	0.90	0.84	0.83	0.86	0.94	0.93	0.95	0.82	0.81	0.83
Living in a Two-Parent Household (ref. = no)	0.82	0.81	0.82	0.61	0.60	0.62	0.89	0.88	0.90	0.85	0.84	0.86
Mother Was Divorced Before the Child's10th Birthday (ref. = no)	1.06	1.05	1.07	1.25	1.23	1.28	1.02	1.00	1.03	1.03	1.02	1.05
Mother Was Hospitalized Before Child's10th Birthday (ref. = no)	1.12	1.10	1.15	1.41	1.36	1.46	1.04	1.01	1.06	1.03	1.00	1.07
Mother Purchased Psychotropic Medications (ref. = no)	1.31	1.30	1.32	2.06	2.03	2.09	1.20	1.18	1.21	1.06	1.05	1.08
Constant	0.20	0.20	0.21	0.02	0.01	0.02	0.13	0.13	0.13	0.04	0.04	0.04

Note: Models are adjusted for child's age, sex, area of residence, and missing data on the father.

Third, because among the children of the 2.5 generation, the proportion of Swedish-born parents is relatively large, we run some sensitivity analyses that account for the background of these Swedish-born parents, and implicitly for the mass emigration of Finnish people to Sweden in the 1960s and 1970s and the later remigration of many of these individuals to Finland. Following the definition used by Statistics Finland, we construct the information on individual origin using four levels: (1) Finnish background and born in Finland, (2) Finnish background and foreign-born, (3) foreign background and born in Finland, and (4) foreign background and foreign-born. We recategorize this variable to include the information on immigrant generational status, and we estimate the regression models with this variable. Our results show that compared with natives, immigrants in all these categories have an increased likelihood of being in poor health across all considered outcomes. This categorization does not have a different impact on the overall generational gradient, but compared with natives, children of the 2.5 generation with an immigrant mother who is not Swedish-born with a Finnish background have a slightly decreased likelihood of receiving inpatient and outpatient care for somatic and any outcomes.

Finally, we run all our analyses using Poisson regression and linear probability models. Our results are stable and qualitatively the same as those obtained with logistic regressions.

Discussion

Having knowledge about the health outcomes of the offspring of immigrants is of considerable importance for Nordic and other high-income countries, where in-migration flows are increasing and exogamous marriages are increasing accordingly (Statistics Finland[6]).

In this article, we tested the role of generational status and of being raised in an exogamous family in the health assimilation process of immigrants. A novel contribution of our work to this field of research is that the analysis included exogamous families, who are often neglected in the literature on health assimilation, and examined register-based outcomes without loss to follow-up or self-report bias. We documented that the assimilation process is driven by the generation of migration and showed that being raised in an exogamous family plays a role in the generational continuum of immigrant health. In particular, we observed that children of the 2.5 generation (i.e., those born to an immigrant and a native parent) have a specific role in explaining the health assimilation process. For example, we found that children living in exogamous families have relatively poor health outcomes, especially in terms of mental health. This finding is particularly important given that this study population made up ~65% of the total population with an immigrant background. The control variables included in our models did not fully account for the observed generational health disparities. The individual characteristics that pertain to the socioeconomic conditions of the family made no explanatory contribution; the characteristics that pertain to stressors, such as the mother's mental health and parental divorce, accounted for only a small fraction of the disparities and particularly for the mental health of the children.

[6] https://www.stat.fi/tup/maahanmuutto/perheet/solmitut-avioliitot.html

The Generational Gradient

Our results show a clear generational gradient for inpatient and outpatient care for any cause, psychopathological disorders, and somatic conditions. For psychopathological disorders, the gradient is clear and steep, with first-generation children having decreased odds and successive generations displaying increased odds of receiving care. For somatic conditions, the gradient indicates that compared with native children, first-generation children have reduced odds, second-generation children have increased odds, and children in exogamous families have similar odds of receiving care. For injuries, both the first and the second generation have reduced odds, but those in the 2.5 generation with an immigrant father have increased odds of receiving inpatient and outpatient treatment. The observed difference between children of the 2.5 generation who have an immigrant father or mother is substantial for all health outcomes ($p < .01$). Our results thus imply that the 2.5 generation should be kept as a separate category whenever possible. Finally, we found that the generational gradient is not fully explained by family background factors (i.e., mother's age, mother's educational level, household consumption income); stressors, such as family instability (i.e., parental divorce before the child's 10th birthday, child not living in a two-parent family); or the mother's poor mental health.

The Selectivity of the First Generation, Adaptation of the Second Generation, and Disadvantage of the 2.5 Generation

We found that first-generation immigrants have better health and lower odds of receiving inpatient and outpatient treatment for all the selected outcomes, reflecting the well-documented selective nature of migration (i.e., the healthy immigrant effect; Jasso et al. 2004; Riosmena et al. 2013; see also Antecol and Bedard 2006; Biddle et al. 2007; Hamilton et al. 2011). Typically, selection effects are observed and demonstrated for individuals who migrate at adult ages: individuals who are well-educated, future-oriented, and willing to move to find work tend to have better health than their peers. Given that children do not make the decision to migrate themselves, they are not directly affected by the same selectivity. However, the families of first-generation children and adolescents may share characteristics from which selection originates that are known to be associated with health behaviors and for which we controlled, including mother's education and household income. Thus, it appears that the health advantage that we observed is not attributable to differences in parental characteristics. Our results support this view: first-generation immigrant children were found to have the same health advantage that has been consistently observed in the literature among adult immigrants. We are aware that family genetic endowments remain unmeasured.

For second-generation immigrants, we also found evidence that they have lower odds of receiving inpatient and outpatient care for psychopathological disorders. However, we found that compared with native children, children with an immigrant father and a native mother have higher odds of receiving care for poor mental health and for injuries. The increased odds of receiving care for the mental health of children living in exogamous families with an immigrant mother is fully explained by the mechanisms we tested. Specifically, this excess morbidity was found to be attributable to the lower socioeconomic status of these children (as measured by maternal

education and household income) and to their exposure to stressors, such as parental divorce before the child's 10th birthday and not living in a two-parent family. However, we also found that children with an immigrant father and a native mother have higher odds of receiving care for psychopathological conditions than children in the other family settings, an effect that remained after adjustment for the socioeconomic conditions of the family and for the aforementioned stressors.

The Association of the Health Differences With Parental Background

Overall, the observed gradients are not explained by the tested mechanisms. When children have an immigrant father and a native mother, they have a greatly increased odds of receiving care for injuries. In all other cases, the relationship between health outcomes and immigrant generation is not significantly affected by the demographic and socioeconomic characteristics of the family, family instability, or poor maternal mental health. This finding is an additional novelty of our study. The effect of being in an exogamous family was previously tested for well-being (Campbell and Eggerling-Boeck 2006) and for psychological adjustment (Jackson et al. 2012). We are the first to provide evidence of a link between this family setting and clinically assessed health measures. Our results are consistent with the body of literature finding that living in an exogamous setting can be stressful for children, with consequences for their well-being and psychological adjustment (Campbell and Eggerling-Boeck 2006). The analysis by parents' region of birth offers some insights into the observed differences between children in exogamous families. Children with a parent of African origin or with a father of Asian origin were shown to be the most disadvantaged. The disadvantages found among children of African descent can be linked to the particular economic and social disadvantages of African immigrants, who typically come from a region that is much poorer than the receiving country. However, our finding that the observed mechanism holds after controlling for two indicators of the socioeconomic background of the family suggests that material circumstances do not fully account for the observed gaps. Given that children of Asian origin were also found to be at particular risk, we believe that ethnicity and mixed race could have a strong impact. Indeed, these two groups of immigrants are among those with the most recognizable ethnic physical traits, and evidence indicates that having such traits is strongly linked to health conditions (see, for instance, Kawachi et al. 2005) and especially to mental health (McGuire and Miranda 2008). Race (i.e., having mixed-race parents, which may be accompanied by unwanted attention and discrimination) may play a role in the explanation for the additional risk to 2.5-generation children whose father or mother was born in Asia or Africa. Another explanation for this finding suggested by the literature is that both African and Asian immigrants tend to have a parenting approach that involves physical discipline and demands for obedience (Salami et al. 2017; Tajima and Harachi 2010). Child-rearing is influenced by ethnic culture, and cultural values may inform parents' child-rearing beliefs and practices, which can have important implications for child development (Chao 2000; Kim and Wong 2002; Tajima and Harachi 2010). For example, Tajima and colleagues (2010) found that Asian immigrants in the United States tend to pass on to their children the core values of Asian cultures, including the importance of hard work, obedience, and helping others. Similarly, Salami et al.

(2017) found that African immigrants, especially fathers, integrate physical discipline, cultural values, and religious practices into their parenting practices. We believe that such parenting practices could play a role in the health disparities observed between generations, especially among the children of exogamous families with an immigrant father. Unfortunately, we could not directly test these mechanisms with our register data. Survey data would be needed to further explore these hypotheses.

Differences by Causes

Our results also show that how the generational gradient operates depends on the health outcome. In contrast to the striking generational pattern that we found for psychopathological disorders, we did not observe a clear pattern for somatic disorders and injuries. Inpatient and outpatient care for somatic disorders appear to follow a unique pattern. We observed a flat gradient, which suggests that the mechanisms driving the likelihood of receiving care for somatic disorders do not differ between natives and immigrant generations, with the exception of the selectivity of the first generation. This flat gradient might also indicate that there is a mechanism reflecting the tendency of the immigrant population to adapt to the health-seeking behaviors of the native population. Moreover, it is possible that many of the somatic disorders studied are less subject to the individual propensity to seek healthcare, given that such disorders often require immediate health assistance.

Potential Explanations

The experience of growing up in an exogamous family setting may have a positive or a negative impact on the health and well-being of children. The social pressure that pushes the child to identify with the majority group can cause stress (Campbell and Eggerling-Boeck 2006). As the literature suggests, positive outcomes might be driven by the ability to adapt to two cultures and the resilience that comes with developing such an ability. Negative outcomes, on the other hand, would suggest that children of exogamous families are facing integration obstacles that lead them to develop psychopathological conditions. As Campbell and Eggerling-Boeck (2006:149) suggested, these mechanisms are likely to occur during adolescence because it is during this phase of life that the individual starts to make sense of the self and to build his/her identity. Living in an exogamous family may make this process especially difficult. Most emotional disorders and many psychotic disorders first appear during adolescence (Paus et al. 2008). The identification of the care needs of potentially suicidal adolescents remains a major public health priority (Gyllenberg et al. 2018). The diagnosis and treatment of a wide range of psychiatric disorders (including the use of services for depression, autism spectrum disorders, and bipolar disorder) have been increasing among adolescents in several high-income countries (Collishaw 2015; Gyllenberg et al. 2018). A recent study of temporal changes in the use of specialized services for the whole spectrum of psychopathological disorders in Finland reported that the cumulative percentage incidence of any diagnosis of a psychiatric or neurodevelopmental disorder at ages 12–18 increased from 9.8% in the 1987 cohort to 14.9% in the

1997 cohort among girls, and from 6.2% in the 1987 cohort to 8.8% in the 1997 cohort among boys (Gyllenberg et al. 2018). In addition, in an exogamous family setting, the parents' integration problems could pose specific risks for the health outcomes of their children. Overall, our results indicate that for exogamous families with a foreign-born father, the negative health effects seem to override any positive health effects. Insights into why children in exogamous families with an immigrant father are, on average, more disadvantaged than children in exogamous families with an immigrant mother are provided by looking at the composition of exogamous families by the country of origin of the immigrant spouse and by their socioeconomic conditions. Among exogamous couples, the immigrant husband is most likely to come from Sweden (28%), the United Kingdom (5%), Turkey (4.7%), or Germany (4%); the immigrant wife is most likely to come from Sweden (23%), a former Soviet Republic (23%), Thailand (4%), or Estonia (3%). These compositional differences are reflected in the families' socioeconomic resources. For example, immigrants who have a European partner are more comparable with the native population in terms of their educational attainment and household income than immigrants who do not. Moreover, compared with their native counterparts, an immigrant spouse/parent who is from Asia tends to be less educated, and a child whose father was born in Turkey or Morocco is more likely to live in a household with a lower income. The lower income levels of these households have also been linked to the higher divorce rate[7] and poorer employment prospects[8] observed among non-European immigrants in Finland.

Given that the family's socioeconomic position and stressors were found to explain only small parts of the observed disadvantage, it seems that the broader social context in the receiving country may be more important than these factors.

As expected, we found that health selectivity attenuates for higher-order generations: it is strongest for the first, weaker for the second, and non-existent for the 2.5 generation. Previous studies conducted in the United States have suggested that the self-esteem of multicultural children, as a measure of their social adjustment, is lower when they compare themselves with the majority group of Whites but is higher when they compare themselves with the minority group of Blacks (Campbell and Eggerling-Boeck 2006; Phillips 2004). Perhaps in a society that is fairly ethnically homogenous, such as Finland, the adaptation process for a child with two cultural backgrounds is particularly hard, which might explain why these children are at higher risk of developing psychopathological disorders.

An additional barrier to integration for immigrants in Finland is the language, and this barrier is likely to affect health outcomes as well. Linguistic competence is a crucial factor in the integration of immigrants because it helps explain disparities between immigrants and natives in terms of educational attainment, earnings, and social outcomes in general (Adserà and Pytliková 2015; Bleakley and Chin 2004).

The different patterns that we observed by cause of inpatient and outpatient care highlight important differences in these processes. The mechanisms we found for somatic conditions and injuries are quite different from those that we detected for psychopathological conditions. Our finding that neither socioeconomic conditions

[7] http://www.tilastokeskus.fi/tup/maahanmuutto/perheet/avioerot_en.html
[8] https://www.stat.fi/tup/maahanmuutto/uth-tutkimus/yhteenveto_en.html

nor stressors explained generational differences in mental health may indicate that broader contextual mechanisms are important. For example, mental health conditions may be more directly connected to integration, lack of community support, and stigma associated with particular family settings (Bratter and Eschbach 2006).

Limitations

Our study also has limitations. The mechanisms that we suggested for explaining the generational gradient for psychopathological disorders that is not explained by the background characteristics of the family (e.g., material and social resources) and the mechanisms that we suggested as potential stressors (e.g., family instability and the mother's poor mental health) are not directly testable with register data. Conducting research that includes additional factors referring to the individual social sphere and the social environment (e.g., integration issues, social support mechanisms, and psychosocial well-being) requires survey data with a sample size that is large enough to study children of exogamous families as a particular risk group.

A second limitation is related to our use of data on inpatient and outpatient care and on purchases of medication as measures of health. These measures can be sensitive to the propensity for health-seeking behavior. Because our results show that the odds of receiving care are greater for higher generations of children, we expect these differences to be conservative without such biases. Using data on inpatient and outpatient care implies that we are measuring the annual prevalence of hospital-level care rather than the prevalence of the diseases. Moreover, the children in our sample contributed to our analyses only for the years when they were present in Finland between the ages of 10 and 18. If children with an immigrant background were visiting their country of origin for long periods, they were not captured in our sample.

Our findings are for Finland, a country that has only recently started receiving immigrants in larger numbers and that has a relatively small albeit rapidly increasing immigrant population. In addition, a relatively large share of the immigrants in Finland are either return migrants from Sweden or descendants of Finnish individuals who emigrated to Sweden. These return migrants do not differ from the native population in terms of language, ethnicity, or cultural traits. Moreover, the Finnish healthcare system is fairly equal in terms of access.

To the best of our knowledge, our study is the first to use objective health measures as outcomes to examine generational health disparities in immigrant adolescents. Finland is an ideal context to study the health of immigrants because the information provided by its healthcare system is reliable. Our findings suggest that more research is needed on this particular phenomenon. Whenever possible, cross-country comparisons based on survey data should be performed that allow other potential explanations to be explored.

Implications and Conclusions

In today's developed countries, where immigration flows are increasing, having information on the health of immigrants in the receiving country and on its determi-

nants is essential for understanding the integration and inclusion processes. Given that our results suggest that children of exogamous families are at particularly high risk of poor health outcomes, the next question that arises is what steps could be taken at the societal level to improve their health outcomes by promoting better integration and inclusion for this specific group. Our findings suggest that individuals who live in exogamous family settings, regardless of their family demographic characteristics and socioeconomic background, constitute a specific risk group with high odds of receiving care for mental health problems. Furthermore, we found that these differences are partly attributable to stressors experienced during a child's life course. This could mean that elements of family and social disruption, which are most likely related to the integration processes of children and families, lead to worse mental health among second- and higher-generation immigrants and among those in exogamous family settings in particular. This assumption is in line with the literature on psychosocial adjustment, which shows that children living in exogamous families tend to experience psychological stress because they find it difficult to identify with either one of the two social/ethnic groups of their parents (Bratter and Eschbach 2006). Furthermore, it corresponds to evidence showing that in the United States, the incidence of low birth weight and infant mortality is higher in children of second-generation intermarried Hispanics than in children of endogamously married Hispanics (Giuntella 2016). Improving the health outcomes of immigrant children is an important policy goal, especially as the health of these children is likely to influence related outcomes later in life, such as their educational outcomes, participation in the labor market, social participation, and social connectedness.

In addition, we believe a better understanding of the reasons for the unobserved mechanisms driving the poor psychopathological outcomes of children in exogamous families will require further research on the broader context of the health outcomes of children of exogamous parents. For instance, studies that examine the integration problems of children and their parents should be conducted. Studies keeping the 2.5 generation as a separate category would be useful for the implementation of targeted interventions. These interventions should include, for instance, close collaboration between healthcare professionals and social workers as a preventive tool. For instance, direct contact of healthcare professionals and social workers with children could take place early in schools to make sure that clinical and psychological preventive measures are put in place starting from young ages. ■

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