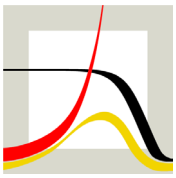

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MPIDR Working Paper WP 2019-009 I May 2019

Health of immigrant children: the role of immigrant generation, exogamous family setting, and family material and social resources

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Abstract

Children of first-generation immigrants tend to have better health than the native population, but over generations, the health advantage of immigrant children deteriorates. It is, however, poorly understood how family resources can explain health assimilation, whether the process of assimilation varies across health conditions, and where on the generational health assimilation spectrum children with one immigrant and one native parent (exogamous families) lie. 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 contribution of family material and social resources on the offspring's outcomes. We use register-based longitudinal data from a 20% random sample of Finnish households with children born in years 1986-2000, free of reporting bias and loss to follow-up. We estimate the risk of being hospitalized for somatic conditions, psychopathological disorders, and injuries by immigrant generation status. Our results show a negative health assimilation process with higher prevalence of physical and, in particular, mental health problems among second-generation immigrant children than among native children, and to first-generation immigrant 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, especially for psychopathological disorders, and that the role of the family seems to be is 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 as well. It has been shown that immigrants represent a specific health risk group, and that knowledge of immigrant health is essential to reducing health inequalities in general (Wilkinson and Marmot 2003; Giannoni, Franzini, and Masiero 2016). 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 (Who 2010; Rechel, Mladovsky, and Devillé 2012). 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 to that of the native population, the health of the immigrant population is better in the first-generation, and is worse in the second and subsequent generations (Rumbaut 1994; Hamilton et al. 2011b; Mossakowski 2015). This phenomenon is thought to result from at least two mechanisms: namely, the positive selective nature of migration (Abraído-Lanza et al. 1999a; Akresh and Frank 2008; Kennedy, McDonald, and Biddle 2006; Jasso et al. 2004) and the "negative health assimilation process" of immigrants in the receiving country (Antecol and Bedard 2006; Hamilton et al. 2011b; Biddle, Kennedy, and Mcdonald 2007).

The first mechanism, selectivity, represents a broad range of positive traits that convert into good health, even though immigrants often also have disadvantaged social determinants of health, such as low education and low income. Because of selectivity, first-generation immigrants tend to have a lower prevalence of a number of health outcomes and lower mortality compared to natives and to immigrants of the second- and the third-generation. The selection process described here refers to first-generation adult migrants, who made the decision to migrate, and who were then exposed to the barriers/opportunities of selectivity. Among children, selectivity does not operate directly, as children do not make the decision to migrate themselves. In this case, selectivity refers to the parents' non-material 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, Levine, and Price 1996). The combination of all of these mechanisms together – i.e., the economic and social capital of the family, and their biological traits – may transfer to children the advantages of migration selectivity. Research that has documented the advantaged outcomes of first-generation migrant children has often focused on very early life measures, such as birth weight (Padilla, Hamilton, and Hummer 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 (Hernandez and Charney 1998; Mendoza 2009; Hamilton et al. 2011a).

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 due to immigrants' upward mobility, while the negative health assimilation model assumes that the health of immigrants will worsen across generations (Alba and Nee 1997; Platt 2005; Gans 2007; Hamilton et al. 2011a). Health assimilation over successive generations of migrants is often explained by the increasing exposure of migrants to the environmental risk factors that native-born individuals are exposed to since birth, and by the consequent adaptation of migrants to the lifestyles and health behaviors of natives (Abraído-Lanza et al. 1999b; Akresh 2007). Another potential reason for the worsening of health conditions across generations is that immigrants often undergo a stressful or unsuccessful integration process in the receiving country (Mossakowski 2015). The family background and the family environment of children are important for their outcomes. The family is a child's first place of socialization (Bales and Parsons 1956), and thus plays a primary role in the process through which the child integrates into the receiving society. The family's composition, demographic characteristics, socio-cultural background, and material resources are all factors that are strongly associated with a child's process of integration, and, ultimately, with his/her health (Capps et al. 2004). Thus, all of these factors have consequences for the health outcomes of children (McLoyd 1998).

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

[1] Here defined as marriage between one immigrant and one native partner.

inclusion and the integration of immigrants (Alba 2005). Although the relationship between intermarriage and integration has been called into question (Song 2009; Rodríguez-García et al. 2015), there is empirical evidence that this multicultural family setting can favor the process of integration in children by encouraging social exchange between social groups, and reducing marginalization and related prejudice (Kalmijn 2010). However, some research has also shown that intermarriage does not always result in positive outcomes for the offspring of exogamous families. Children living in exogamous families may experience problems in identifying with one or both of the social groups of their parents (i.e., with the maternal or the paternal social group) because they face disapproval and social pressure from the members of both groups (Bratter and Eschbach 2006). In the U.S., there is evidence of a higher incidence of low-birth weight and infant mortality in children of second-generation intermarried Hispanics, compared to children of endogamously married Hispanics (Giuntella 2016).

In this article, we use high-quality register data with a large sample size to study whether the experience of being born to an exogamous family is associated with the mental and physical health of children, playing a role in the explanation of health assimilation across immigrant generations. Taking Finland as a case study, we aim to (1) assess the health assimilation process of 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 in order 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) evaluate whether differences in health across immigrant generations can be explained by differences in family social and economic resources or potential stressors; and (3) test whether the generational gradient operates in different ways depending on the cause of hospitalization, and whether children in exogamous families are more or less likely than second- and first-generation immigrants to be hospitalized for certain causes. As different causes of hospitalization refer to different health dimensions, analyzing these causes enables us to measure different processes. We assume that psychopathological conditions are more directly connected with integration issues than other causes, as 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). It has also been shown that adolescents who engage in risky behavior are at higher risk of being injured in

various ways (Begg, Langley, and Williams 1998). As somatic conditions reflect all of the 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 socioeconomic conditions of the family (Cockerham 2007).

The existing evidence on the effects that being raised in an exogamous family setting have on the clinically assessed physical and mental health of the offspring is still lacking. To the best of our knowledge, this paper 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 Empirical Evidence

Earlier sociological research, both quantitative and qualitative, has looked at the ability of children living in multiracial families[2] to develop multiple identities, and at the effects this pressure can have on their psychological well-being. Studies have, for example, found 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. Children's ability to turn their "multiracial identity into a psychological resource" helps them integrate more easily in both cultural contexts (Binning et al. 2009). Those who find it difficult to turn 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, Shih, and Garcia 2009). One limitation of these studies is that the variables they use are all self-rated constructs, which makes it harder to identify the sequence of the processes. Discrimination is also likely to play a role in this process, as 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

[2] In this section, we refer to categories such as "multiracial families," "racial groups," and "ethnic groups" as they were conceptualized in the papers we cite. 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 societal differences between the U.S. context (where much of the literature comes from) 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.

discriminated against and elevated levels of distress (Todorova et al. 2010), especially in the context of identity formation (Sellers et al. 2003). Specific to health, a higher incidence of low-birth weight and infant mortality was found in children of second-generation intermarried Hispanics, compared to children of endogamous couples, in the U.S. (Giuntella 2016).

Several different socio-demographic mechanisms can help to explain the health differentials between immigrant generations and within exogamous family settings. Age of the mother 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, Belizán, and Lammers 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 (Myrskylä et al. 2013; Goisis et al. 2017; Barclay and Myrskylä 2016). It is well known that the fertility schedules of immigrant women differ from those of native women. Immigrant mothers tend to have a higher number of children than native mothers, 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 (N E Adler and Ostrove 1999; Nancy E Adler et al. 1994). The educational levels of the parents are indirectly linked to their children's health outcomes, as 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, we note that previous research has found that the distribution of educational attainment 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, as immigrant-native wage gaps have been observed in many countries (Thomsen,

Gernandt, and Aldashev 2008; Chiswick and Miller 2009). Thus, it is important to account for education, labor force status, and income when studying health differentials between immigrants and natives.

A number of studies have found strong associations between family structure and stability for various health outcomes of children. Children are generally shown to 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 accepted in some countries. While children's health tends to be better in a two-parent than in a single-parent household, stability in the home appears be more important than the number of parents living with the child (Mariani, Özcan, and Goisis 2017; Ziol-Guest and Dunifon 2014). Parental conflicts and union dissolution are linked to poor child health, as 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). It has been acknowledged that the risk of marital dissolution is higher among exogamous couples than among endogamous couples, as exogamous couples may have more misunderstandings and conflicts due to their differences in cultural background (Zhang and Van Hook 2009; Kuroki 2017). The higher propensity for marital dissolution in this particular family setting could help explain the generational gradient.

According to previous research, the mental health of the mother is likely to influence a number of her children's outcomes, including their psychiatric health (Priel et al. 2018), their behavior in school, their academic achievement, and their school attendance (Claessens, Engel, and Chris Curran 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). It is well known that immigrants are at particular risk of developing mental health problems in all of the migration phases. In the phase after they arrive in the receiving country, immigrants are likely to face integration issues, while also having low socioeconomic status and poor working conditions (Lindert et al. 2008). All of these factors are associated with an increased risk of

developing mental health problems. In this paper, we focus on maternal mental health as a predictor of the child's outcomes, as disorders such as depression are twice as likely to occur in women as in men (Kessler et al. 2003; Claessens, Engel, and Chris Curran 2015).

Data

The study data were derived from various Finnish register data files covering the 1986–2000 birth cohorts. The Children Data File includes a 20% random sample of households with at least one child aged 0–14 at the end of 2000. The data do not suffer from non-response, reporting bias, or loss to follow-up. The dataset contains annually updated individual-level information on all household members (n=414,931), supplemented with a 20% random sample of 0–14-year-olds not living in private households (n=1,599), and all non-resident biological and adoptive parents of all 0–14-year-olds in the two samples (n=27,809). The data include 187,417 children in total. The sample has been linked to health care data, which are used to assess health outcomes. We follow children from 1987 to the end of 2011, the year for which the most recent health information is available. We exclude all children for whom there is no information on their biological mother (N=513), and use person-years as observations. All children who were living in a household in Finland at some point between the ages of 10 and 18, and for whom maternal information is available, contribute to the person-years count (N=185,145). We limit our analyses to those person-years during which the children's mothers were residing in Finland (excluding 883 children, 10,056 persons-years). The final size of the sample is 1,227,286 person-years, contributed by 184,262 children.

Key Measures

Our key outcomes consist of inpatient and outpatient hospitalization 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). Inpatient data are available from 1970 to 2011, but outpatient data are available from 1998 to 2011 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. As our analyses are limited to children ages 10–18, the children of the 1986 cohort have one year less of outpatient data.

Individuals who were born outside of 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: native children are children born in Finland to native parents and children born abroad to native parents (reference category); 1st generation migrant children are children born abroad whose parents were born abroad; 2nd generation children are children born in Finland whose parents were born abroad; and generation 2.5 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. Generation 2.5 also includes children born abroad to exogamous families. 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 of the 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 1st 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 very low. 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 very low. Similar misclassification errors might occur among children of natives and 2nd generation children when paternal information is missing.

The information available in the linked dataset used in the analyses as a control includes gender of the child (measured at baseline); age of the child (10-18 years, categorical, one-year groups); and area of residence (Helsinki and Uusimaa hospital district (capital area) versus other districts), both time-varying and measured at the end of preceding year. In order to analyze the impact of family characteristics on the generational gradient of health, and the role of exogamous families in the health assimilation process, we include controls for age of the biological mother at the time of child birth (younger than 25, 26-29, older than 30); educational level of the mother (no secondary education, secondary education, tertiary education); household consumable

income, both time-varying and measured at the end of the preceding year; family stability, defined as living in a two-parent family versus in other settings, time-varying and measured at the end of preceding year, and whether the parents divorced prior to child's 10th birthday; mental health of the mother, as indicated by hospitalization for psychopathological disorders (ICD9 (1987–1996): 295–302, 307, 309, 310, 312, 316; ICD10 (1996–2011): F20–F69, F99), measured prior to the child turning age 10; and mother's purchase of psychotropic medications (ATC: N05–N07, excluding N07B), time-varying, measured each year during the follow-up.

Empirical Approach

We apply logistic regressions with standard errors, clustered by each individual to account for the violation of non-independence between observations.

We estimate three models for each of the outcomes. In model 1, we describe the generational gradient, controlling for age, missing information on the father, sex, and area of residence of the children. In model 2, we also include the background characteristics of the parents and the family (age of the mother at childbearing, education of the mother, and household income) in order to analyze to what extent these factors account for the generational gradient. In model 3, we include the controls of models 1 and 2 (age, missing information on the father, sex, and area of residence of the children; age of the mother at childbearing; education of the mother; and household income) as well as not living in a two-parent family, divorce of the parents prior to the child's 10th birthday, and the mental health of the mother in order to assess the effects of potential stressors on the gradient.

Results

Individuals with an immigrant background contribute 66,365 person-years, or 5.4% of the total study population (Table 1). Of the children with an immigration background, 23.1% belong to the 1st generation and 12.3% belong to the 2nd generation. Of the children with an immigrant background, around 65% come from an exogamous family. In roughly half of these cases, the child has an immigrant mother and a native father; while in the other half, the child has an immigrant father and a native mother.

Table 2 shows that the share of cases in which there is missing information for the father is very low for native children (1.4%), is slightly higher for 2nd generation children (5.6%), and is very high for 1st generation children (25.4%).

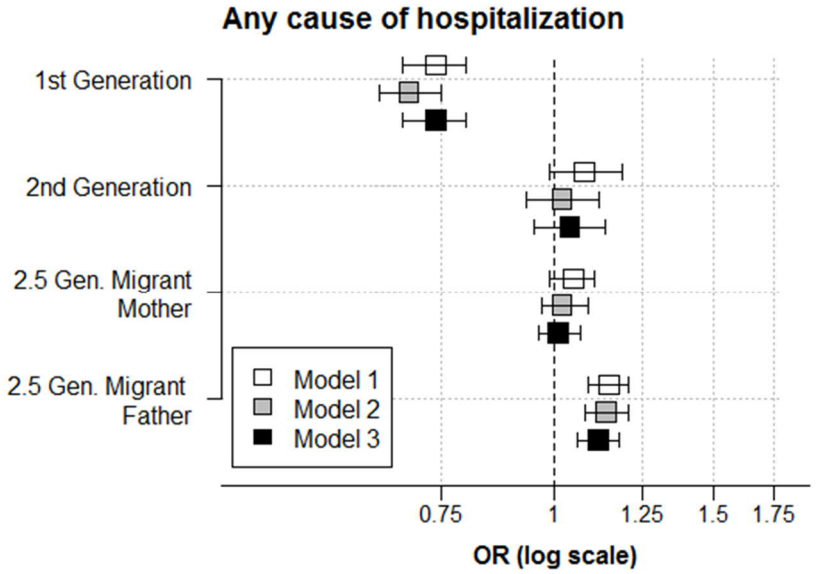
Large shares of the children of immigrants live in the capital area (Helsinki and Uusimaa), especially children of the 1st (50%) and 2nd generations (66%); while the children of natives are more likely to live in other areas (75%). Mothers of 1st and 2nd generation children are, on average, less educated than native mothers: 42% of native mothers have a tertiary degree, compared to 25% of mothers of the 1st generation and 17% of mothers of the 2nd generation. However, the educational differentials between natives and migrants are less pronounced when immigrant mothers are married to native men. Household income tends to be far lower in migrant families than in native families, and especially in families of 1st and 2nd generation children. The proportions of families in the highest income tertile are 7.4% for those with 1st generation children, 8.9% for those with 2nd generation children, 30.3% for those with native children. The native-migrant differential is smaller for families with 2.5 generation children (~24 irrespective of which parent is immigrant). Parents of the 2nd and 2.5 generations have a higher risk of divorcing before their child's 10th birthday (~20% for 2nd and 2.5 generations) than parents of the 1st generation and natives. Migrant mothers are, on average, younger than Finnish mothers, and especially those of 1st generation children. Native mothers are, on average, older than migrant mothers, irrespective of the migration background of the husband. While the proportion of children living in a two-parent household is highest in native families, the native-migrant differential is smaller in families with 1st generation children (71.9%) and with 2.5 generation children when the mother is an immigrant (72.9%). Mothers of migrant children are more likely than mothers of native children to be hospitalized for psychopathological disorders, and to use psychiatric medications.

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 Figures 1 (any cause of hospitalization) and 2 (hospitalization for psychopathological disorders, somatic conditions, and injuries). The full models are also included in Tables 3, 4, 5, and 6 (in the appendix).

Figure 1 shows the generational gradient on any hospitalization cause (full model estimates in Appendix Table 3). In Model 1, we observe a clear pattern of an increasing risk of hospitalization for any of the three causes over the immigrant generations. Compared to natives, 1st generation immigrants are 26% less likely to be hospitalized, which reflects the selective nature of migration (OR 0.74; CI 0.68–0.80). 2nd generation immigrants, the risk of hospitalization does not differ significantly from that of natives (OR 1.08; CI 0.99–1.19), or of 2.5 generation children with an immigrant mother (OR 1.05; CI 0.99–1.11). However, 2.5 generation children with an immigrant father are 15% more likely than natives to be hospitalized for any cause (OR 1.15; CI 1.09–1.21).

Figure 1. The generational gradient on any hospitalization cause. Odds ratio estimated with logistic regression with robust standard errors clustered by individuals.



Model 1 is adjusted for age of the child, sex, area of residence, and missing data on the father.
Model 2: Model 1 + age of the mother at childbearing, education of the mother, household income.
Model 3: Model 2 + living in a two-parent family, divorce of the parents prior to the child's 10th birthday, mental health of the mother.

In model 2 (Appendix Table 3), we test for demographic and socioeconomic characteristics of the family as potential explanatory factors of the generational gradient. We include age of the mother at childbirth, a dummy for missing paternal information, maternal education, and household income. Controlling for these demographic and socioeconomic mechanisms does not account for the generational gradient, as the slope of this gradient does not change from model 1 to model 2, though it shifts to the left. This finding means that the

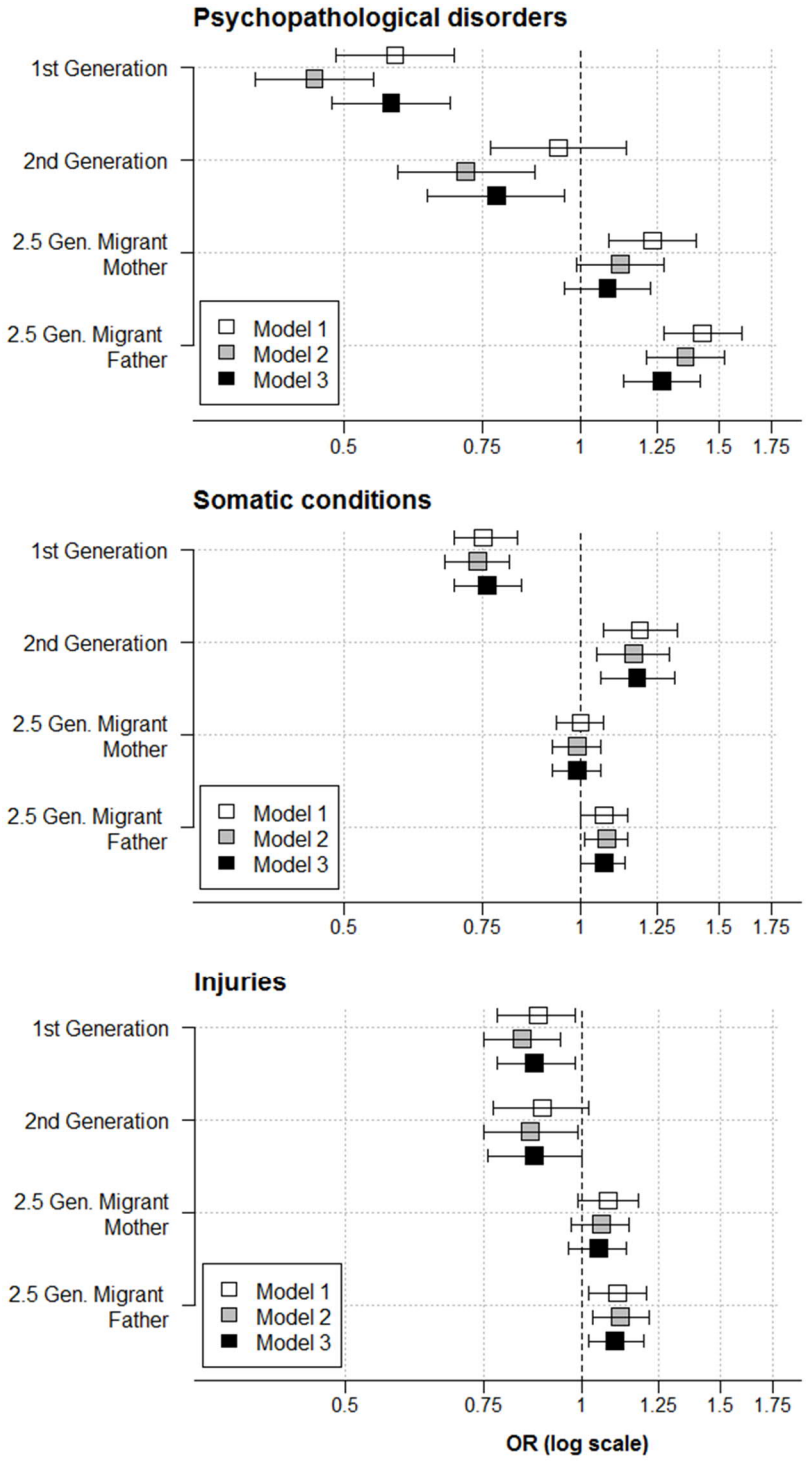
coefficients decrease slightly, which in turn implies that for 1st generation children, whose parents are, on average, less educated than native parents, controlling for this socioeconomic disadvantage decreases the odds ratio for hospitalization. Older age of the mother is positively associated with poor health outcomes for her children: compared to children of younger mothers (<26 years old), children of mothers aged 26+ age are 7% more likely to be hospitalized. Education of the mother and household income do not seem to have a strong relationship with hospitalization for any cause (Appendix Table 3).

In model 3 (Appendix Table 3), we analyze whether controlling for potential stressors can explain the generational gradient. These controls include family stability (divorce of the parents prior to the child's 10th birthday and whether the child lives in a two-parent family during follow-up) and mental health problems of the mother (annual use of psychotropic medication during follow-up and hospitalization for psychopathological disorders before the child's 10th birthday). All of 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 a 15% decreased risk of being hospitalized, while divorce of the parents prior to the child's 10th birthday is positively associated with poor health. Children whose parents divorced are 6% more likely to be hospitalized than children who did not experience this stressful event. Both indicators of the mental health condition of the mother are associated with a higher risk of hospitalization. More specifically, children of mothers who were hospitalized when the child was under age 10 are 10% more likely to be hospitalized, and children whose mothers purchased psychotropic medications during the follow-up are 33% more likely to be hospitalized.

To test for different mechanisms operating on the generational gradient depending on the outcome, we apply the same analytic procedure to hospitalization by cause (Figure 2: psychopathological disorders, somatic conditions, and injuries).

We find that the generational gradient is particularly clear and strong for the mental health of children (Figure 2 – full model estimates in Appendix Table 4). Compared to native children, children of the 1st generation are 40% less likely to be hospitalized for psychopathological disorders (OR 0.58; CI 0.49–0.69) (HIE), while children of the 2nd generation are equally likely to be hospitalized for psychopathological disorders (OR 0.94; CI 0.77–1.14).

Figure 2. The generational gradient on hospitalization for psychopathological disorders, somatic conditions and injuries. Odds ratio estimated with logistic regression with robust standard errors clustered by individuals.



Model 1 is adjusted for age of the child, sex, area of residence, and missing data on the father.
Model 2: Model 1 + age of the mother at childbearing, education of the mother, household income.
Model 3: Model 2 + living in a two-parent family, divorce of the parents prior to the child's 10th birthday, mental health of the mother.

Children of exogamous families display the highest risk of being hospitalized for psychopathological disorders: compared to children of natives, their risk is 40% higher when the father is a migrant (OR 1.43; CI 1.28–1.60) and is 20% higher when the mother is a migrant (OR 1.23; CI 1.09-1.40).

In model 2 (Appendix Table 4), we test for the role of the demographic and socioeconomic characteristics of the family on children's likelihood of being hospitalized 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 on psychopathological disorders. Again, as we observed in the case of hospitalization for any cause, the coefficients decrease in magnitude, but the slope of the gradient does not change. It is worth to noting, however, that in Model 2nd generation immigrants are 30% less likely than natives to be hospitalized – a result that could suggest that the selectivity of families in terms of mental health persists into the 2nd generation. Contrary to our findings for hospitalization for any cause, we 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 a significantly higher risk of hospitalization. Specifically, we find that children of mothers with less than secondary education are 30% more likely to be hospitalized than children of better-educated mothers, and children of families with low income are almost 60% more likely to be hospitalized than children of higher-income families. Advanced maternal age is also associated with an increased risk of hospitalization for children (around 25% higher than that of children of younger mothers).

In model 3 (Appendix Table 4), we test for stressor mechanisms, such as family stability and the mental health of the mother. In this case, we observe a clear attenuation of the gradient. It should be noted that in this model, the risk of being hospitalized for mental health problems does not differ from that of natives for children of the 2.5 generation born to an immigrant mother and a native father. However, the risk of being hospitalized for mental health problems is 30% higher than that of natives for children born to exogamous families with an immigrant father. The stressor mechanisms are strongly associated with children's mental health, and have the expected signs: children living in a two-parent household are 40% less likely to have mental health problems, while children of divorced parents are 30% more likely to have such problems. Maternal mental health is also a strong predictor of children's mental health outcomes. In

particular, when the mother uses psychotropic medications, her children's risk of being hospitalized more than doubles.

The likelihood of being hospitalized for somatic conditions (Figure 2 – full model estimates in Appendix Table 5) seems to be less related to immigrant generation than to the presence of psychopathological disorders. For somatic conditions, we observe a 25% decreased likelihood of hospitalization for 1st generation immigrant children (OR 0.75; CI 0.69-0.83), and a 20% increased likelihood for 2nd generation children (OR 1.19; CI 1.07-1.33), compared to that for natives. However, we do not observe a full generational gradient. This result seems to reflect the selective nature of migration that characterizes the 1st generation, and the negative health assimilation of the 2nd generation. Furthermore, the mechanisms tested in models 2 (demographic characteristics and socioeconomic conditions of the family) and 3 (stressors) (Appendix Table 5) do not seem to be linked to the likelihood of being hospitalized for somatic conditions. An exception to this observed pattern is the maternal use of psychotropic medications, which is associated with a 20% increased risk of hospitalization.

In the case of injuries (Figure 2 – full model estimates in Appendix Table 6), we again observe in model 1 a decreased likelihood of hospitalization for immigrant children of the 1st generation. Surprisingly, we also observe an association in the same direction for the 2nd generation (both showing around a 10% decrease in the risk of being hospitalized). Children of the 2.5 generation with an immigrant father have a slightly higher (10%) likelihood of being hospitalized for injuries than that of natives (OR 1.11; CI 1.02-1.21). In models 2 and 3 (Appendix Table 6), the coefficients of the generational gradient are not affected at all by the tested mechanisms.

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 where exogamous marriages are increasing accordingly (Statistics Finland[3]).

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

[3] https://www.stat.fi/tup/maahanmuutto/perheet/solmitut-avioliitot.html. Retrieved on January 15, 2019.

paper to this field of research is that we examined register-based outcomes without loss to follow-up or self-report bias, and included exogamous families in our analysis. We documented how the assimilation process is driven by the generation of migration, and we observed that children of the 2.5 generation (i.e., those born to a migrant and a native parent) plays a role in the health assimilation process. For example, we found that children living in exogamous families have relatively poor outcomes, especially in terms of mental health. This finding is particularly important given that this study population made up ~65% of the total. 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; while the characteristics that pertain to stressors, such as the mental health of the mother and the divorce of the parents, accounted for a small fraction of the disparities, and particularly for the mental health of the children.

Our results show a clear generational gradient for hospitalization for any cause, for psychopathological disorders, and for somatic conditions. For psychopathological disorders, the gradient is clear and steep, with successive generations showing increased morbidity. For somatic conditions, the gradient indicates that compared to native children, 1st generation children have reduced odds, 2nd generation children have increased odds, and children in exogamous families have the same odds of being hospitalized. For injuries, both the 1st and the 2nd generation have reduced odds, but those in the 2.5 generation with an immigrant father have increased odds of being hospitalized. Our results thus imply that the 2.5 generation should be treated as a separate category whenever possible. Finally, we found that the generational gradient is not fully explained by family background factors (i.e., age of the mother, educational level of the mother, household consumption income), stressors like family instability (i.e., divorce of the parents prior to the child's 10th birthday, child not living in a two-parent family), or to the poor mental health of the mother.

Our findings indicate that 1st generation immigrants have better health and a lower likelihood of being hospitalized for all of the selected outcomes, which reflects the well-documented selective nature of migration (healthy immigrant effect) (Jasso et al. 2004; Riosmena, Wong, and Palloni 2013) (Antecol and Bedard 2006; Hamilton et al. 2011b; Biddle, Kennedy, and Mcdonald 2007). Typically, selection effects are observed and demonstrated for individuals who migrate at adult ages; i.e., individuals who are well-educated, future-oriented,

and willing to move to find work tend to have better health than their peers. Our results demonstrate that such selection effects apply to the 1st generation children of migrants. As we mentioned above, the selection process does not operate in the same way or through the same paths in children as it does in adults. As children do not make the decision to migrate themselves, they are not directly affected by selectivity. However, their families are. Thus, 1st generation children and adolescents may be positively selected on the basis of family characteristics, which can include unobserved family socioeconomic characteristics or even family genetic endowments.

For 2nd generation immigrants, we also found evidence that they have lower odds of being hospitalized for psychopathological disorders. However, our results show that children with an immigrant father and a native mother are at much higher risk than native children of having poor mental health and of being injured. The worse mental health of children living in mixed families with an immigrant mother was fully explained by the mechanisms we tested. Specifically, this excess morbidity was found to be attributable to the lower SES of these children, as measured by maternal education and household income; and to their exposure to stressors, such as the divorce of the parents before the child's 10th birthday and not living in a two-parent family. However, our findings also indicate that children with an immigrant father and a native mother have a much higher probability of being hospitalized for psychopathological conditions than children in the other family settings; and that this effect remains after adjustment for the socioeconomic conditions of the family, and for the aforementioned stressors.

Overall, the observed gradients are to a large extent not explained by the tested mechanisms. When children have an immigrant father and a native mother, they have a greatly increased risk of being hospitalized for injuries. In all other cases, the relationship between health outcomes and immigrant generation was not significantly affected by the demographic and socioeconomic characteristics of the family, by family instability, or by poor maternal mental health. This finding is an additional novelty of our paper. 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 that found 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).

Our results further show that how the generational gradient operates depends on the health outcome. In contrast to the striking generational pattern we found for psychopathological disorders, we did not observe a clear pattern for somatic disorders and injuries. Hospitalizations for somatic disorders appear to follow a unique pattern. We observed a "flat gradient," which suggests that the mechanisms driving the likelihood of being hospitalized for somatic disorders do not differ between natives and migrant generations, with the exception of the selectivity of the 1st generation. This flat gradient might also indicate that there is a mechanism reflecting the tendency of the migrant 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 health care, as they 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 different 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 (2006, p. 149) has 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. In addition, in an exogamous family setting, the integration problems of the parents could pose specific risks for the health outcomes of the children. Overall, our results indicate that for exogenous families with a foreign-born father, the negative effects seem to override any positive effects. Given that the family's socioeconomic position and stressors explained only small parts of this disadvantage, it seems that the broader social context in the receiving country is more important than these factors.

As expected, we found that health selectivity attenuates for higher-order generations: i.e., it is strongest for the 1st, weaker for the 2nd, and non-existent for the 2.5 generation. Previous studies conducted in the U.S. have suggested that the self-esteem of multicultural children, as a measure of their social adjustment, is lower when they compare themselves to the majority group of whites, but is higher when they compare themselves to the minority group of blacks (Phillips 2004; Campbell and Eggerling-Boeck 2006). It may be the case that in a society that is fairly ethnically homogenous, like Finland, the adaptation process for a child with two different cultural backgrounds is particularly hard. This 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. It has been shown that linguistic competence is a crucial factor in the integration of migrants, as it helps to explain disparities between immigrants and natives in terms of educational attainment, earnings, and social outcomes in general (Bleakley and Chin 2004; Adserà and Pytliková 2015). The different patterns that we observed by cause of hospitalization highlight important differences in these processes. The mechanisms we found for somatic conditions and injuries are quite different from those we detected for psychopathological conditions. Our finding that neither socioeconomic conditions 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, such as material and social resources; and the mechanisms we suggested as potential stressors, such as family instability and the poor mental health of the mother; are not directly testable with register data. To conduct research that includes additional factors that refer to the individual social sphere and social environment – such as integration issues, social support mechanisms, and psychosocial well-being – survey data with a sample size that is large enough to treat children of exogamous families as a particular risk group are needed.

A second limitation is related to our use of hospitalizations and purchases of medication, as there might be differences in the propensity to seek treatment by cultural background. 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.

Implications and Conclusions

In today's developed countries, where immigration flows are increasing, having information on the health profiles of 2nd generation migrants in the receiving country, and on their determinants, is essential for understanding the integration and inclusion processes. As 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 promote better integration and inclusion for this specific group, and which could in turn improve their health outcomes. These 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 a very high prevalence of mental health problems. Furthermore, we found that these differentials 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 2nd 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 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 is in line with the evidence found regarding the higher incidence of low-birth weight and infant mortality in children of second-generation intermarried Hispanics, compared to children of endogamously married Hispanics, in the U.S. (Giuntella 2016). Improving the health outcomes of migrant 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, their participation in the labor market, their social participation, and their social connectedness.

We believe that in order to better explain the reasons for the unobserved mechanisms driving the poor psychopathological outcomes of children in exogamous families, further research on the broader context of the health outcomes of children of exogamous parents is needed. For instance, studies that examine the integration problems of children and their parents should be carried out.

Acknowledgements

This work is financially supported by the Max Planck Society within the framework of the research initiative “The Challenges of Migration, Integration and Exclusion” (WiMi).

Appendix

Table 1. Absolute and percentage distributions of the target population (N=person-years), prevalence (%), and 95 CIs of the selected health outcomes by immigrant background and generation. Individuals aged 10-18 (proportion of person-years with outcomes during follow-up).

			Proportion of persons-years hospitalized by selected outcomes (% values and CI in brackets)			
	N	**%**	**Any**	**Somatic**	**Psychopathology**	**Injury**
Native Population	1,160,921	94.6	16.9 (16.8-16.9)	12 (12.0-12.1)	2.8 (2.8-2.8)	3.4 (3.4-3.5)
Total population with immigrant background	66,365	5.4	17.2 (16.9-17.5)	11.8 (11.6-12.1)	3.4 (3.2-3.5)	3.5 (3.4-3.7)
		100				
Among the population with immigrant background:						
1st Generation	15,357	23.1	13.8 (13.3-14.4)	9.5 (9.0-10.0)	2.3 (2.1-2.5)	3.1 (2.9-3.4)
2nd Generation	8,175	12.3	18.2 (17.3-19.0)	13.7 (13.0-14.5)	3.1 (2.7-3.5)	3.1 (2.7-3.5)
Generation 2.5 immigrant mother and native father	20,724	31.2	17.5 (17.0-18.0)	11.9 (11.5-12.4)	3.4 (3.2-3.7)	3.7 (3.5-4.0)
Generation 2.5 immigrant father and native mother	22,109	33.3	18.9 (18.4-19.4)	12.7 (12.2-13.1)	4.2 (3.9-4.5)	3.8 (3.6-4.1)
		100				

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

	Total population		**Natives**		**1st generation**	**2nd generation**	**2.5 generation immigrant mother**	**2.5 generation immigrant father**
	N	%	N	%	%	%	%	%
Data on father missing	20396	1.7	16034	1.4	25.4	5.6	0.0	0.0
Female	600730	49.0	568049	48.9	49.3	48.9	48.5	50.1
Helsinki & Uusimaa area	323946	26.4	294728	25.4	49.8	66.3	32.4	42.7
Maternal education								
Basic – lower than secondary	175487	14.3	155013	13.4	51.8	53.6	26.2	12.2
Secondary	537265	43.8	513999	44.3	23.5	29.0	38.2	42.4
Tertiary	514534	41.9	491909	42.4	24.7	17.5	35.6	45.4
Median household income	424437	34.6	406792	35.0	16.7	19.2	31.4	31.6
Parents divorced	148791	12.1	137319	11.8	7.9	20.9	19.2	20.7
Mother's age at child birth								
25 or younger	301024	24.5	276696	23.8	53.4	36.5	35.8	25.9
26-30	454859	37.1	433462	37.3	26.7	34.8	33.4	34.0
Over 30	471403	38.4	450763	38.8	20.0	28.7	30.8	40.1
Two-parent family	959797	78.2	913284	78.7	71.9	66.7	72.9	67.4
Mother's health								
Psychiatric hospitalization	22351	1.8	21053	1.8	0.8	2.6	2.5	2.1
Psychiatric medication prescription	167149	13.6	158304	13.6	9.0	11.5	14.7	15.7

Table 3. Hospitalization for any of the three causes. Odds ratio estimated with logistic regression with robust standard errors clustered by individuals.

Hospitalization for any of the three causes	Model 1			Model 2			Model 3		
Age (ref. 10)	OR	95% Conf. Int.		OR	95% Conf. Int.		OR	95% Conf. Int.	
11	1.10	1.08	1.12	1.10	1.08	1.12	1.10	1.08	1.11
12	1.09	1.07	1.10	1.09	1.07	1.10	1.08	1.06	1.10
13	1.17	1.15	1.19	1.17	1.15	1.19	1.16	1.14	1.18
14	1.33	1.30	1.35	1.32	1.30	1.34	1.31	1.29	1.33
15	1.33	1.30	1.35	1.32	1.30	1.35	1.31	1.28	1.33
16	1.24	1.21	1.26	1.23	1.21	1.26	1.21	1.19	1.23
17	1.25	1.22	1.27	1.24	1.22	1.27	1.21	1.18	1.23
18	1.24	1.21	1.27	1.23	1.21	1.26	1.19	1.16	1.21
Sex (ref. Male)									
Female	0.93	0.92	0.95	0.93	0.92	0.95	0.93	0.92	0.95
Area									
Helsinki & Uusimaa	1.07	1.06	1.09	1.09	1.07	1.11	1.06	1.04	1.08
Generation (ref. Native)									
1st	0.74	0.68	0.80	0.69	0.64	0.75	0.74	0.68	0.80
2nd	1.08	0.99	1.19	1.02	0.93	1.12	1.04	0.95	1.14
2.5 Immigrant mother, native father	1.05	0.99	1.11	1.02	0.97	1.09	1.01	0.96	1.07
2.5 Immigrant father, native mother	1.15	1.09	1.21	1.14	1.08	1.21	1.12	1.06	1.18
Missing information on the father in the data	1.17	1.10	1.25	1.14	1.07	1.21	1.08	1.01	1.15
Education of the mother (ref. Tertiary)									
No secondary				1.12	1.09	1.15	1.11	1.08	1.14
Secondary				1.05	1.03	1.07	1.06	1.04	1.08
Household income tertile (ref. Highest)									
Lowest				1.04	1.02	1.06	0.96	0.94	0.98
Middle				1.04	1.02	1.06	1.02	1.00	1.04
Mother's age at childbirth (ref. Under 26)									
26-30				0.93	0.91	0.95	0.93	0.91	0.95
Over 30				0.92	0.90	0.94	0.91	0.89	0.92
Child lives in a two-parent family (ref. No)							0.86	0.84	0.87
Mother was divorced prior to the child's 10th birthday (ref. No)							1.06	1.04	1.09
Mother was hospitalized prior to child's 10th birthday (ref. No)							1.10	1.04	1.17
Mother purchased psychotropic medications (ref. No)							1.33	1.30	1.35
Number of observations 1227286, 184262 clusters									

Table 4. Hospitalization for psychopathological disorders. Odds ratio estimated with logistic regression with robust standard errors clustered by individuals.

Hospitalization for psychopathological disorders	Model 1			Model 2			Model 3		
Age (ref. 10)	OR	95% Conf. Int.		OR	95% Conf. Int.		OR	95% Conf. Int.	
11	1.01	0.98	1.05	1.01	0.98	1.05	1.00	0.97	1.04
12	1.06	1.02	1.10	1.06	1.02	1.10	1.04	1.00	1.08
13	1.32	1.27	1.38	1.33	1.28	1.38	1.29	1.24	1.34
14	1.65	1.59	1.72	1.62	1.55	1.68	1.57	1.51	1.64
15	1.79	1.72	1.87	1.76	1.69	1.84	1.69	1.62	1.76
16	1.80	1.72	1.88	1.77	1.70	1.85	1.67	1.59	1.74
17	1.88	1.80	1.97	1.85	1.76	1.93	1.69	1.62	1.77
18	1.75	1.67	1.83	1.69	1.61	1.77	1.49	1.42	1.56
Sex (ref. Male)									
Female	1.10	1.06	1.14	1.10	1.06	1.14	1.09	1.05	1.13
Area									
Helsinki & Uusimaa	1.72	1.65	1.78	1.84	1.77	1.91	1.68	1.61	1.75
Generation (ref. Native)									
1st	0.58	0.49	0.69	0.46	0.38	0.55	0.57	0.48	0.68
2nd	0.94	0.77	1.14	0.71	0.58	0.87	0.78	0.64	0.96
2.5 Immigrant mother, native father	1.23	1.09	1.40	1.12	0.99	1.28	1.08	0.95	1.23
2.5 Immigrant father, native mother	1.43	1.28	1.60	1.36	1.21	1.52	1.27	1.13	1.42
Missing information on the father in the data	1.79	1.59	2.01	1.55	1.38	1.74	1.34	1.19	1.51
Education of the mother (ref. Tertiary)									
No secondary				1.30	1.23	1.37	1.25	1.18	1.31
Secondary				1.10	1.06	1.15	1.12	1.08	1.17
Household income tertile (ref. Highest)									
Lowest				1.56	1.49	1.63	1.14	1.09	1.20
Middle				1.21	1.16	1.26	1.11	1.06	1.16
Mother's age at childbirth (ref. Under 26)									
26-30				0.83	0.80	0.87	0.83	0.79	0.87
Over 30				0.87	0.83	0.91	0.83	0.79	0.87
Child lives in a two-parent family (ref. No)							0.62	0.59	0.64
Mother was divorced prior to the child's 10^{th} birthday (ref. No)							1.27	1.20	1.33
Mother was hospitalized prior to child's 10^{th} birthday (ref. No)							1.31	1.19	1.45
Mother purchased psychotropic medications (ref. No)							2.21	2.12	2.29
Number of observations 1227286, 184262 clusters									

Table 5. Hospitalization for somatic conditions. Odds ratio estimated with logistic regression with robust standard errors clustered by individuals.

Hospitalization for somatic conditions	Model 1			Model 2			Model 3		
Age (ref. 10)	OR	95% Conf. Int.		OR	95% Conf. Int.		OR	95% Conf. Int.	
11	1.09	1.07	1.10	1.09	1.07	1.10	1.09	1.07	1.10
12	1.05	1.03	1.07	1.05	1.03	1.07	1.05	1.03	1.06
13	1.10	1.08	1.12	1.10	1.08	1.12	1.10	1.08	1.12
14	1.21	1.19	1.23	1.21	1.19	1.23	1.20	1.18	1.23
15	1.20	1.18	1.23	1.20	1.18	1.23	1.19	1.17	1.22
16	1.12	1.10	1.15	1.12	1.10	1.15	1.11	1.09	1.14
17	1.13	1.10	1.15	1.13	1.10	1.15	1.11	1.08	1.13
18	1.12	1.10	1.15	1.12	1.10	1.15	1.10	1.07	1.13
Sex (ref. Male)									
Female	1.06	1.04	1.08	1.06	1.04	1.08	1.06	1.03	1.08
Area									
Helsinki & Uusimaa	0.96	0.94	0.98	0.96	0.94	0.98	0.95	0.93	0.97
Generation (ref. Native)									
1st	0.75	0.69	0.83	0.74	0.67	0.81	0.76	0.69	0.84
2nd	1.19	1.07	1.33	1.17	1.05	1.30	1.18	1.06	1.32
2.5 Immigrant mother, native father	1.00	0.93	1.07	0.99	0.92	1.06	0.99	0.92	1.06
2.5 Immigrant father, native mother	1.07	1.00	1.15	1.08	1.01	1.15	1.07	1.00	1.14
Missing information on the father in the data	1.09	1.01	1.17	1.08	1.00	1.16	1.04	0.97	1.12
Education of the mother (ref. Tertiary)									
No secondary				1.09	1.06	1.12	1.08	1.05	1.12
Secondary				1.05	1.03	1.07	1.05	1.03	1.08
Household income tertile (ref. Highest)									
Lowest				0.98	0.96	1.01	0.95	0.92	0.97
Middle				1.03	1.00	1.05	1.02	1.00	1.04
Mother's age at childbirth (ref. Under 26)									
26-30				0.97	0.95	1.00	0.97	0.95	0.99
Over 30				0.97	0.94	0.99	0.96	0.93	0.98
Child lives in a two-parent family (ref. No)							0.92	0.90	0.95
Mother was divorced prior to the child's 10th birthday (ref. No)							1.00	0.97	1.03
Mother was hospitalized prior to child's 10th birthday (ref. No)							1.04	0.97	1.12
Mother purchased psychotropic medications (ref. No)							1.20	1.17	1.23
Number of observations 1227286, 184262 clusters									

Table 6. Hospitalization for injuries. Odds ratio estimated with logistic regression with robust standard errors clustered by individuals.

Hospitalization for injuries	Model 1			Model 2			Model 3		
Age (ref. 10)	OR	95% Conf. Int.		OR	95% Conf. Int.		OR	95% Conf. Int.	
11	1.21	1.17	1.26	1.21	1.17	1.26	1.21	1.16	1.25
12	1.26	1.21	1.31	1.26	1.21	1.31	1.26	1.21	1.31
13	1.33	1.28	1.38	1.32	1.27	1.38	1.32	1.27	1.37
14	1.56	1.50	1.62	1.56	1.50	1.62	1.56	1.50	1.62
15	1.51	1.45	1.57	1.51	1.45	1.57	1.50	1.44	1.56
16	1.33	1.28	1.39	1.33	1.28	1.39	1.32	1.27	1.38
17	1.30	1.25	1.36	1.30	1.24	1.36	1.28	1.23	1.34
18	1.37	1.31	1.43	1.37	1.31	1.43	1.34	1.28	1.41
Sex (ref. Male)									
Female	0.56	0.55	0.58	0.56	0.55	0.58	0.56	0.55	0.58
Area									
Helsinki & Uusimaa	1.06	1.04	1.09	1.06	1.04	1.09	1.05	1.02	1.07
Generation (ref. Native)									
1st	0.88	0.78	0.98	0.84	0.75	0.94	0.87	0.78	0.98
2nd	0.89	0.77	1.02	0.86	0.75	0.99	0.87	0.76	1.00
2.5 Immigrant mother, native father	1.08	0.99	1.18	1.06	0.97	1.15	1.05	0.96	1.14
2.5 Immigrant father, native mother	1.11	1.02	1.21	1.12	1.03	1.22	1.10	1.02	1.20
Missing information on the father in the data	1.04	0.95	1.15	1.03	0.93	1.13	0.99	0.90	1.09
Education of the mother (ref. Tertiary)									
No secondary				1.09	1.05	1.13	1.09	1.05	1.13
Secondary				1.03	1.00	1.05	1.03	1.00	1.06
Household income tertile (ref. Highest)									
Lowest				0.92	0.90	0.95	0.87	0.84	0.90
Middle				0.98	0.96	1.01	0.97	0.94	1.00
Mother's age at childbirth (ref. Under 26)									
26-30				0.90	0.87	0.93	0.90	0.88	0.93
Over 30				0.81	0.79	0.84	0.81	0.79	0.84
Child lives in a two-parent family (ref. No)							0.90	0.87	0.93
Mother was divorced prior to the child's 10th birthday (ref. No)							1.10	1.06	1.14
Mother was hospitalized prior to child's 10th birthday (ref. No)							1.06	0.97	1.16
Mother purchased psychotropic medications (ref. No)							1.09	1.06	1.13
Number of observations 1227286, 184262 clusters									

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