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What is the association between the ethnic composition of neighbourhoods, workplaces and schools and the formation of mixed-ethnic unions?

Allan Puur[1] | Leen Rahnu[1,2,3] | Tiit Tammaru[3]

[1]Estonian Institute for Population Studies, Tallinn University, Tallinn, Estonia

[2]Faculty of Social Sciences, INVEST flagship, University of Turku, Turku, Finland

[3]Centre for Migration and Urban Studies, University of Tartu, Tartu, Estonia

Correspondence
Leen Rahnu, Researcher at Estonian Institute for Population Studies, Tallinn University, Uus-Sadama 5, M-553, 10120 Tallinn, Estonia.
Email: leen.rahnu@tlu.ee

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Abstract

Although ethnic diversity and the types of interpersonal ties that are experienced in various domains of life may vary considerably, studies regarding the local marriage market rarely focus on the relationship between the formation of mixed-ethnic unions and the ethnic composition of more than one spatial context. In this study, by applying event history analysis methods to longitudinal register data from Finland, we address three spatial contexts: residential neighbourhoods, workplaces and schools. The main finding is that getting in contact with natives in all three spatial contexts elevates the probability of the formation of a mixed-ethnic union between migrants and natives. Exposure to natives in residential neighbourhoods and workplaces does not lose its relevance for partnership outcomes among immigrants who have arrived in the host country as children, or among the descendants of immigrants. On the contrary, the effects that can be associated with higher concentrations of immigrants in neighbourhoods and workplaces tend to increase in strength for the second generation rather than decrease.

KEYWORDS
Finland, local marriage market, mixed-ethnic unions, neighbourhood, workplace, event history analysis

1 | INTRODUCTION

The formation of mixed-ethnic unions has been a popular research topic among scholars from various disciplines, one which revolves around topics such as the role of group norms and individual preferences, and matches between the characteristics of the partners (such as in terms of age, education and religious affiliation), or how structural opportunities (in terms of the size of groups, sex ratios, etc.) serve to shape prospects when it comes to finding a partner (Dribe & Lundh, 2011; Hannemann et al., 2018; Kalmijn, 1998; Kalmijn & van Tubergen, 2010; Qian et al., 2001). Our approach in this paper aligns with existing research on opportunity structures, extending to the analysis of how the ethnic makeup of the spatial context in which people spend their daily lives—also referred to from this point onwards as domains—may serve to affect the formation of mixed-ethnic unions. Such a focus, we believe, is increasingly relevant in societies in which the size of migrant communities is on the rise (Choi & Tienda, 2017), whereas the opportunities of immigrants when it comes to encountering natives in different life domains may vary in time and space (Hall et al., 2019). Although it has been generally agreed ever since Gordon (1964) that the spread of mixed-ethnic unions is a good indicator of ethnic integration into a society, there is a need to improve our understanding of how opportunities to meet, along

with group norms and individual preferences, all serve to coproduce outcomes in terms of partner selection for immigrants.

From a spatial perspective, self-enforcing processes often operate which may shape the ethnic encounters of migrants with natives in different life domains. Members of the different migrant, ethnic or racial groups tend to sort themselves into certain neighbourhoods, schools and workplaces, either intentionally or unintentionally, voluntarily or due to various constraints (Bernelius & Vilkama, 2019; Boterman, 2019; Hall et al., 2019; Hall & Crowder, 2014; Ihlanfeldt & Mayock, 2018). This could lead to the formation of an ethnically diverse but operationally segregated society, as segregation in one domain tends to lead to segregation in other domains, both during one's individual life course and across generations (Tammaru et al., 2021). Our study seeks to understand the consequences of these spatially selective sorting processes on the selection of partners. We expect to find systematic differences in the formation of mixed-ethnic unions—defined as partnership between a migrant and a native Finn—depending on the ethnic makeup of the spatial context of daily life. Encountering natives in different life domains may elevate the probability of forming mixed-ethnic unions because immigrants find a native partner from neighbours, coworkers or co-students, or through social networks that evolve in these contexts. For several reasons, the associations in the three domains with mixed unions may not be similar. First, every person has neighbours, but not all people work or study. Second, the intensity of social interaction in different domains varies as well; interaction with neighbours is often less intense compared with interactions between coworkers and schoolmates. In addition, preferences towards ethnic groups may reinforce the association between ethnic encounters and partner selection as they lead people to sort themselves into certain neighbourhoods or workplaces. Finally, being exposed to ethnic diversity could increase the overall openness towards ethnically mixed unions. This study focuses to the role of spatial opportunity structure on the formation of mixed-ethnic unions, whereas confounding role of ethnic preferences, though not directly measured, is discussed where relevant.

Although analyses on opportunity structures from a spatial perspective—local marriage markets—are extensive (Blossfeld & Timm, 2003; Eckhard & Stauder, 2019; Lichter et al., 1995), the spatial detail in these studies usually remains at the country, regional or city levels. The few studies that have aimed for a more detailed (intra-urban) account of the spatial context mainly focus on where potential partners live, that is, focusing on the role of the ethnic composition of residential neighbourhoods on the formation of mixed ethnic unions (Gabriel, 2018; Houston et al., 2005). However, people may also be exposed to and interact with members of various ethnic groups in other life domains (Gordon, 1964).

The main contribution of this study relates to the process of gaining an improved understanding of the role being played by the ethnic makeup of the various spatial contexts in the formation of mixed-ethnic unions between immigrants and natives. We are guided by the time geographic and activity space approaches (Hägerstrand, 1970; Miller, 1991; Mooses et al., 2016; Neutens et al., 2011; Pred, 1977; Thrift & Pred, 1981; Wang et al., 2012), and we will extend this to an analysis of the formation of mixed-ethnic unions. The three spatial contexts we consider are residential neighbourhoods, workplaces and schools. By focusing on immigrant partnership formation with natives, we seek stepwise answers to three research questions. First, what is the overall association between the ethnic makeup of each spatial context—residential neighbourhoods, workplaces and schools—and the formation of mixed-ethnic unions? Second, what are the associations between the ethnic composition of spatial contexts and the formation of mixed-ethnic unions when the contexts are considered jointly? Third, how does the association between ethnic makeup in three spatial contexts and the formation of mixed-ethnic unions vary by gender, immigrant origin groups and generation?

We rely on register data from Finland when it comes to answering these questions. Like other Nordic countries, Finland runs a high-quality population register, which covers all of the people who live within the country's borders. Individual-level register data are spatially detailed, longitudinal and relational, allowing us to track people on an annual basis and relate them to their partners, neighbours and work colleagues, that is, to consider the ethnic makeup of the key spatial contexts in which people live their daily lives. Although Finland is a relatively new immigration country, the number of immigrants has steadily increased in recent decades.

We study the first partnerships formed in Finland during the period between 1999 and 2014. By applying an event history framework, we are able to follow migrants and their descendants as they turn 18 until the formation of their first partnership. Those migrants who arrive in Finland at older ages, but who are single upon arrival, are included from the date of arrival. In the following sections, we further elaborate upon our analytical framework, introduce data and methods and present empirical results, which are structured around our main research questions. The paper ends with a brief discussion of the results, along with concluding remarks.

2 | SPATIAL CONTEXTS AND MIXED-ETHNIC UNIONS

Patterns of partnering behaviour are shaped by influences from own-group norms, individual preferences and opportunities to meet and interact with potential partners in one's daily life (Blau, 1977; Kalmijn, 1998; Kalmijn & Flap, 2001; Kulu & González-Ferrer, 2014; Okamoto, 2007; Spörlein et al., 2014). Migrants are members of different ethnic, racial and religious groups: they have often socialised into the values and norms of these groups and they may face the expectation to marry someone from their own group and to avoid marriage across group boundaries (Kulu & González-Ferrer, 2014). In addition to group norms, individual preferences operate as a mental compass in terms of recognising attractiveness in others and deciding whom to consider as a suitable partner,

while spatially and functionally organised opportunities to meet possible partners—marriage markets—shape the realisation of partner preferences. Preferences regarding suitable partners are complex but not random; people tend to like others who are similar to themselves even in the absence of own-group pressures (Kalmijn, 1998).

The marriage market is structured around the relative availability of partners who are similar enough in terms of shared ethnic origin, race, nativity, religion, education, social class or age (Bhrolchain, 2001; Furtado & Theodoropoulos, 2011; Lichter & Qian, 2019). Therefore, one of the most crucial structural constraints of the marriage market is relative group size (Choi & Tienda, 2017; Hwang et al., 1997). The bigger the size of the ethnic group, the easier it is to find a co-ethnic partner, whereas a serious shortage of potential co-ethnic partners encourages the crossing of ethnic boundaries. For instance, among the native majority population, the structural opportunities to meet potential partners clearly favour co-ethnic partnerships (Puur et al., 2018; Rahnu et al., 2020), but among migrants, this is not necessarily the case. Migrants' social ties to host country are, by default, less elaborated but, over time, meaningful relationships in a host country will evolve. Proximity in various domains of daily life—such as residential neighbourhoods, workplaces or schools—help to build up those social ties, which are important in the formation of mixed-ethnic unions (Houston et al., 2005; Kalmijn & Flap, 2001; Rahnu et al., 2020). As an example, according to the seven stages of assimilation by Gordon (1964), the formation of mixed-ethnic unions prerequisites a large-scale entering of minorities into the various institutions of the host society, where they can meet and interact with members of the native majority population. This is in line with one of the fundamental principles of spatial interaction, claiming that people in close proximity tend to have a stronger influence on each other than do people who are more distant from one another (Galster, 2012; Tobler, 1970). Some of the potential influences are more indirect, relating more to exposure to other people and social norms, while others stem from a more direct and firsthand contact between people who are living or acting within the same spatial setting. Increasing shares of migrants, however, may slow down such interaction with natives.

Following on from the above, and guided by recent advancements in segregation research, we extend the research on marriage markets from national, regional and city levels to multiple spatial contexts or life domains, which, when taken together, form the daily activity space for people. The concept of an *activity space* combines spatial, temporal and cognitive dimensions of activities along which differences between individuals can arise (Mooses et al., 2016; Wang et al., 2012) and where interactions between the individual and the environment emerge (Golledge & Stimson, 1997; Neutens et al., 2011). The activity space includes locations that people physically visit, with homes, workplaces, schools and leisure time activity sites being the most important spatial settings in which social interaction takes place (Kukk et al., 2018; Silm & Ahas, 2014a; Tammaru et al., 2021). The ethnic makeup of these life domains shapes opportunities to meet members of the other groups.

2.1 | The relevance of ethnic encounters in residential neighbourhoods

Residential neighbourhood is one of the most common dimensions to be addressed in various studies, which aim to contextualise the formation of mixed-ethnic unions. From the perspective of the marriage market, interaction that concentrates around the residential neighbourhood is important because one's home is the centre of one's activity space (Silm & Ahas, 2014b; Tammaru et al., 2021). Additionally, many leisure time activities take place close to home, which is something that enhances the probability of finding a partner from 'next door' (Bozon & Rault, 2012; Houston et al., 2005). Although some studies claim that neighbourhoods are losing their importance as places in which partners actually meet (Bozon & Heran, 1989; Kalmijn & Flap, 2001; Lampard, 2007), place of residence is still an essential component for understanding the daily activity spaces of people and, as a consequence, how marriage markets function.

Immigrants often enter residential ethnic clusters upon arrival, and this initial residential pattern is slow to change (Hou, 2007). Several characteristics that are specific to any immigrant population help to shape the processes of residential segregation and integration. Residential segregation generally relates strongly to income inequality because 'money buys choice' on the housing market and because immigrants tend to perform less successfully on the labour market in comparison to the natives (Hulchanski, 2010). Over time, however, a proportion of the immigrant population begins to leave ethnic neighbourhoods. As members of a minority group tend to adapt to the culture of their host country (acculturation), advance up the socioeconomic ladder and improve their incomes, they tend to move away from ethnic neighbourhoods, which also leads to increased coresidence with members of the native majority population or to the spatial assimilation of immigrants (Bolt & van Kempen, 2010; Clark, 2017; Massey & Denton, 1987; South et al., 2005; Vaalavuo et al., 2019).

Sorting into residential neighbourhoods also hinges upon preference and discrimination (Clark & Rivers, 2012). The preference for living in co-ethnic areas and discriminatory practices on the part of the native majority population could reduce spatial mobility so that ethnic minorities may not match their socioeconomic status with that of the neighbourhood in the same way as does the native majority population (Bolt & van Kempen, 2010; Harris, 1999; Johnston et al., 2004). Research evidence shows a strong preference for co-ethnics when it comes to sorting into residential neighbourhoods (Frey, 1979; Leetmaa et al., 2015), workplaces (Strömgren et al., 2014) and schools (Cordini et al., 2019), in the form of the processes, which are labelled 'white flight' and 'ethnic avoidance'; as the share of immigrants and ethnic and racial minorities increases in certain residential neighbourhoods, workplaces or schools, members of the native majority population may start leaving those areas or avoid sorting into them. The life course stage may also be important in sorting. For example, preferences in terms of a neighbourhood's ethnic makeup are more likely to shape residential mobility in family ages, with residential choice being strongly related to differences in school quality

levels and the ethnic makeup of the schools (Owens et al., 2016; Saporito & Hanley, 2014).

2.2 | The relevance of ethnic encounters in workplaces

Although only a share of individuals may be employed, the ethnic composition of the workplace may be highly important in the formation of mixed-ethnic unions. First, social interactions in workplaces and schools are often more intense and meaningful in comparison to the less intense interactions between neighbours (Baron & Bielby, 1980; Stainback & Tomaskovic-Devey, 2012; Tasan-Kok et al., 2014; van Ham & Tammaru, 2016). Second, considering the high residential segregation of many racial, ethnic and migrant groups in multi-ethnic societies (Arbaci, 2007, 2019; Musterd, 2005), studies that focus on local marriage markets should not be limited only to one spatial context.

Workplaces are considered particularly crucial arenas, where social inequalities are both produced and reproduced (Baron & Bielby, 1980; Tomaskovic-Devey et al., 2006) and where important social interactions take place (Kokkonen et al., 2014). For various reasons, immigrants tend to sort into different workplaces in comparison with the native majority population (Andersson, Garcia-Perez, et al., 2010; Bygren, 2013; Ellis et al., 2007; Wright et al., 2010), leading both to labour market segmentation (sorting into occupations and sectors) and labour market segregation (sorting into workplace establishments) (Sinitsyna et al., 2021). Such differential sorting may relate to labour demand in the host country, the productive characteristics of the immigrants, the network-based job search that can be undertaken by potential employees and the hiring practices of employers, plus the tendency of employers to discount the education and previous work experience of migrants (Buzdugan & Halli, 2009; Ioannides & Loury, 2004; Strömgren et al., 2014). On the other hand, businesses that provide specific ethnic goods and services (such as restaurants) and employers with an immigration background often employ immigrants rather than natives (Åslund & Nordström Skans, 2010).

Workplaces tend to be less segregated in comparison with residential neighbourhoods (Strömgren et al., 2014; Tammaru et al., 2021; Toomet et al., 2015). From a spatial perspective, the distribution of employment opportunities does not necessarily match the residential distribution of immigrants (Ellis et al., 2004; Marcińczak et al., 2015). The availability of jobs elsewhere in the city results in immigrants heading towards workplaces, which are located outside ethnic residential concentrations, especially when their skills allow them to compete with natives in the labour market (Strömgren et al., 2014). From the hiring perspective, anti-discrimination laws aim to reduce discrimination and facilitate ethnic and racial diversity in the workplace (Wrench, 2016). The various forms of social interaction in the workplace between colleagues and clients, and in the immediate environs of the workplace, all serve to facilitate exposure for working immigrants to the native majority population. Hence, increased workplace diversity may be an important factor, which helps to shape the formation of mixed ethnic unions.

2.3 | The relevance of ethnic encounters in schools

The third spatial setting for meeting, and having direct and firsthand contact, with peers pertains to education (Martinovic, 2013). This is especially the case for child migrants and second-generation immigrants. Due to intense social interaction at schools, exposure to cultural diversity in educational institutions may be important in the formation of mixed ethnic unions. As children transit from childhood to adolescence and adulthood, romantic relationships between peers become more common. It is therefore not surprising that, in addition to their primary role as educational institutions, universities function as important marriage markets as well (Blossfeld & Timm, 2003), elevating the possibility that a young adult of migrant origin will find a native partner.

Sorting into schools usually depends on two factors: distance from home to school and the academic quality of the school (Altenhofen et al., 2016; Bernelius et al., 2021; Hastings et al., 2005; Nieuwenhuis & Xu, 2021). Studies of ethnic residential segregation and ethnic school segregation reveal that segregation levels tend to be higher in schools (Andersson, Bråmå, & Holmqvist, 2010; Boterman, 2019). In the case of large-scale immigration, levels of school segregation may rise even more rapidly than levels of residential segregation, because the age structure of immigrants is often relatively young, leaving them overrepresented among families which have children (Bernelius & Vilkama, 2019; Finney & Simpson, 2009). However, residential location as a factor in determining school segregation decreases with age and the probability of becoming exposed to peers who are culturally diverse, but who share similar aspirations, increases in higher levels of education.

2.4 | Intergroup differences in the effects of the marriage market

To conclude, the ethnic diversity of residential neighbourhoods, workplaces and schools has grown in immigrant societies. Empirical evidenc regarding variations in marriage market conditions and the prevalence of mixed-ethnic unions with native partners across groups of origin (Kalmijn & van Tubergen, 2010; Lanzieri, 2012; Lee & Boyd, 2008; Lucassen & Laarman, 2009; Safi & Rogers, 2008), immigrant generation (Huschek et al., 2012; Wiik et al., 2020) and gender (Jacobs & Labov, 2002; Muttarak & Heath, 2010) is becoming available, but further investigation continues to be relevant when it comes to the role of specific settings in which people spend their daily lives (Qian & Lichter, 2007, 2011; Schwartz, 2013; Spörlein et al., 2014). There is yet very little research on the role of the ethnic makeup of immediate daily spatial contexts in terms of the formation of mixed ethnic unions. Existing studies lead us to expect that getting into

direct and firsthand contact to out-group members could facilitate the formation of mixed ethnic unions. However, what is less clear is which spatial context may be more important, and how the importance varies along with gender, origin or immigrant generation.

3 | THE FINNISH CONTEXT

Compared to other Nordic countries, Finland's experience as a receptacle of international migration is more recent. Immigration flows only began increasing in the 1990s, but growth since then has been quite rapid. Between the 1990s and 2010s, net migration tripled in Finland, paralleled with a diversification of the geography of migration flows (Statistics Finland, 2021). Since the 1990s, there has been a persistent decrease in the share of arrivals from European countries and an increase in the share of arrivals from more distant regions, particularly Asia.

This positive net migration has resulted in a marked expansion of the share of population, which is of immigrant origin. In relative terms, immigrant-origin groups form 7% of the country's total population. According to the latest statistics, the first generation of these comprises more than 84% of the total population of immigrant origin, while the remaining 16% are the Finland-born children of immigrants. Slightly more than half (54%) of the share of population that has an immigrant background originates from Europe, while 28% comes from Asia, 13% from Africa and 5% from other continents. For individual countries, the largest subgroups of immigrant-origin population originate from the neighbouring Russian Federation and Estonia, followed by more distant countries, such as Iraq, Somalia, the former Yugoslavia, China and Vietnam.[1]

For the most part immigrants live in the three main urban areas of Finland, as well as along the southern and western coastal areas, and also in areas, which are close to the Russian border to the east (Vaattovaara et al., 2010). Residential segregation levels within the cities have grown along with the increase in the number of immigrants. The capital city of Helsinki has so far succeeded in avoiding a very high spatial concentration of migrant groups in specific districts (Kauppinen, 2002; Torpan et al., 2020). However, the tendency of the migrant population to remain outside the labour market or to be concentrated in lower-paid jobs increased during the economic recession of the 2000s (Vaattovaara et al., 2010). A recent study further shows that, with rising incomes, migrants in Finland tend to be less likely than native Finns to move out of less disadvantaged neighbourhoods (Vaalavuo et al., 2019), thereby enforcing spatial segregation.

The increasing size of the immigrant-origin population has also had an effect on partnership patterns (Heikkilä, 2006, 2015; Lainiala & Säävälä, 2013; Leinonen, 2011). Evidence obtained from the register extract that has been used in this study indicates that, among working age immigrants who had a co-residential partner, the overall proportion of exogamous unions with native Finns was at 44% for men and 48% for women (Table 1). However, there are substantial differences that can be associated with country or region of origin. In some groups—such as with men and women from western countries, or men and women from 'other' countries (the majority of migrants in this residual category originate from various Latin American or African countries), or women from Asian countries—having a native partner is more common than having a partner of immigrant origin. To the other extreme, exogamy with natives appears very rare among men and women from Somalia and women from the Middle East.

Table 1 also shows the proportion of employed individuals among the immigrant-origin population (of age groups between 18 and 64). Compared to native Finns, the gap amounts to 9% for men and 17% for women. Only Estonian men and women exhibit a share of employment that is on a par with the natives of the host country. For other immigrant groups, the proportion of individuals who are employed appears lower, with particularly large gaps, which are relative to native Finns being characteristic of immigrants from a Somali and Middle Eastern background.

To sum up, the immigration context in Finland has been very dynamic in recent decades. It is characterised by the arrival of increasing number of immigrants of diverse origins with different integration outcomes in various domains of life. A recent study indicates that neighbourhood and workplace ethnic context are related to the likelihood of individuals from native majority population of Finland forming inter-ethnic unions with immigrants (Rahnu et al., 2020). However, it is not clear how the individual-level partnership choices of immigrants are shaped by ongoing changes and variations in the population composition in different domains of life.

4 | DATA AND METHODS

Our study is based on longitudinal register data compiled by Statistics Finland. The entire data set covers all residents who ever lived in Finland between 1999 and 2014. In this article, we investigate individuals who are of immigrant origin and for whom we were able to construct a continuous partnership history from the age of 18 onwards or from their arrival in Finland in the case that they were single at the time of their arrival. We define individuals of immigrant origin either as persons who have arrived in Finland as immigrants or persons who were born in Finland to immigrant parents. Return migrants who were born abroad to Finnish-born parent(s) are excluded from the analysis. Therefore, our study population includes both first-generation and second-generation immigrants. In terms of birth cohorts, our research data cover individuals who were born between 1981 and 1996 (i.e., those who were aged 18 or younger in 1999 and who reached the age of 18 before 2014). A small group of adolescents who had started a union before the age of 18 were excluded from the analysis. Also, those first-generation migrants who had a partner at the time of their arrival were defined as marriage migrants and were also excluded from the analysis.

The event that is of key interest here is the formation of a first partnership in Finland. Based on the yearly information about place of residence (down to the specific dwelling), co-residing conjugal partners are identifiable in the Finnish register data, even when they are unmarried and childless. In this study, we draw on the procedure that

TABLE 1 Characteristics of immigrants from different countries or regions of origin, men and women, Finland 2013

Origin	Population size, total (*N*)	Population size, age 18–64 (*N*)	Population employed, age 18–64 (%)	Population in unions, age 18–64 (%)	Share of exogamous unions with native Finns (%)
Men					
Native Finns	2,503,942	1,548,072	68	59	4
Migrants, all origins	176,422	130,370	59	51	44
West	39,584	31,608	66	62	88
Russia	31,545	21,710	57	55	13
Estonia	21,186	16,403	72	41	17
Eastern Europe	14,964	11,000	64	54	25
Somalia	8,307	4,546	30	30	8
Middle East	26,270	19,712	43	48	36
Asia	20,807	15,298	62	46	22
Other	13,759	10,093	59	48	59
Women					
Native Finns	2,600,116	1,515,188	73	63	3
Migrants, all origins	170,790	124,413	56	59	48
West	29,340	22,658	68	61	87
Russia	45,421	33,551	54	61	42
Estonia	22,500	17,424	73	50	36
Eastern Europe	13,195	9,430	58	67	27
Somalia	7,579	4,013	20	33	3
Middle East	16,191	10,185	32	60	7
Asia	26,239	20,439	53	66	56
Other	10,325	6,713	52	55	52

Note: Mixed-ethnic unions are defined as partnerships between persons of immigrant origin and native Finns. In this table, the use of 'West' signifies western Europe, North America, Australia and New Zealand. 'Other' is a residual category that mainly signifies various Latin American countries but also any country that does not fit under the major categories listed above. *Source*: Finnish register data, authors' calculations.

has been employed in the register to identify partnerships. We use discrete time data with yearly intervals; the first observation of when partners are registered at the same address is considered to indicate the beginning of their marital or cohabiting union. One of the limitations of this approach is that it misses unions in which partners de facto cohabit but are registered at different addresses, as well as transnational partnerships where one of the partners does not reside in Finland. Also, cohabiting unions that are of a relatively short duration (less than a year) and that are formed and dissolved between two yearly observation points are not considered.

For the purposes of this study, we distinguish between two types of partnership for immigrant-origin persons: exogamous unions (where the partner is a native Finn) and endogamous unions (where both partners are of immigrant origin).[2] To denote exogamous unions, we also employ the term 'mixed-ethnic partnership' in the article. In order to account for the heterogeneity of immigrants who have settled in Finland, we have grouped immigrants and their descendants into persons who are of western and non-western origins.[3] In broad terms, this grouping divides countries of origin into those that are closer to Finland in terms of language, culture, geographical location and/or standard of living and that can be classified as western and those that are geographically and culturally more distant from Finland and that have lower standards of living, allowing these to be classified as non-western. Over 90% of non-western migrants originate from countries in which the gross domestic product (GDP) in the year 2000 was less than 50% of that of Finland.

We also distinguish between first- and second-generation immigrants, as well as those in the middle in the form of a 'generation 1.5'. In the same order, these groups comprise immigrants who settled in Finland at the age of 16 or later, immigrants who arrived at ages between birth and 15 and persons who were born in Finland to immigrant parents. Following any necessary exclusions, our research data set included a total of 49,117 immigrant-origin men who formed 7,330 exogamous partnerships and 12,494 endogamous partnerships and 30,803 women who formed 5,946 exogamous partnerships and 8,957 endogamous partnerships (Table 2).[4]

Statistical methods. We estimated event history models that involved separate piecewise constant proportional hazards for immigrant-origin men and women. The exposure time began at the age of 18 or at the age they had reached upon arrival in Finland in the case of first-generation migrants, with exposure time ending in the year during which the first partnership of a given type was formed. Observations were censored under the following conditions: if a person was not involved in a co-residential partnership by the year of 2014, if a person died, left the host country or started a competing type of partnership. In order to account for the fact that union formation risks vary by age we held our baseline hazard (age) constant during the intervals of 2 years but allowed it to vary between them. For both men and women, we fitted two sets of competing risk models: for exogamous and endogamous partnerships respectively. To provide an insight into variations within the effects, our main independent variables were interacted by immigrant origin and immigrant generation.

Measures of residential neighbourhoods, workplaces and school attendance. In order to measure variations in exposure to the native population, we constructed several measures for the various life domains, neighbourhoods, workplaces and schools. These measures were applied as proxies, which served to characterise the local marriage market conditions when it comes to opportunities for meeting natives and migrants, as well as to the local networks of interaction.

For neighbourhoods, we calculated the time-varying share of immigrants in the area of residence for the 18–40 age groups,[5] that is, individuals who are the most active in the partnership market. In terms of spatial aggregation, preference was given to neighbourhoods that could be defined according to postal service codes (or, in US terms, zip code areas, which totalled more than 1,600). To avoid reverse causality running from partnership formation to the residential neighbourhood variable, we backdated the variable that was related to place of residence by 1 year.

The data used in the study provided employment information for all currently employed individuals, including the encrypted identification numbers of the establishment at which a person worked. This allowed us to calculate the time-varying share of immigrants in the workplace. Unlike the specification being used for neighbourhood, no restriction was imposed upon the age of employees because, by default, work-related information is limited to the working-age population. Individuals who were currently not employed were classified either as studying or were included in the residual category. We also experimented with backdating our work-related variables, but, unlike the calculations for neighbourhood, the results deemed this unnecessary.

TABLE 2 Number of persons, exposure time, and union formation events in the research dataset, immigrant-origin population, Finland, birth cohorts 1981–1995

			Number of union formation events			
Immigrant-origin population	Number of persons	Exposure-time (years)	Exogamous with native Finns	Endogamous with immigrants	All	Share of exogamous unions with native Finns (%)
Men						
All	49,117	190,973	7,330	12,494	19,824	37
Western origin	26,195	101,091	4,565	6,439	11,004	42
Non-western origin	22,922	89,882	2,765	6,055	8,820	31
1st generation	35,249	122,672	4,013	9,555	13,568	30
1.5 generation	11,755	62,203	2,938	2,815	5,753	51
2nd generation	2,113	6,098	379	124	503	75
Women						
All	30,803	110,095	5,946	8,957	14,903	40
Western origin	18,619	65,803	4,413	5,146	9,559	46
Non-western origin	12,184	44,292	1,533	3,811	5,334	29
1st generation	17,802	56,641	2,589	5,205	7,794	33
1.5 generation	11,083	48,327	2,942	3,517	6,459	46
2nd generation	1,918	5,127	415	235	650	64

Note: *Source*: Finnish register data, authors' calculations.

For the domain of education, we distinguished between school attendance in the host country at the compulsory and post-compulsory levels. The rationale behind this distinction was the assumption that exposure to native peers tends to have a stronger influence if it starts at a younger age. Therefore, individuals who arrived in Finland at the age of 10 or earlier were classified as having attended (most of) their compulsory education in the host country. Individuals who had been in post-compulsory education in Finland were classified as having attended post-compulsory education starting from the first year of their enrolment.

Control variables. In order to account for the fact that neighbourhoods and workplaces markedly vary in size, we included controls for both domains. The neighbourhood size is a continuous variable which indicates the number of residents in the area (at logarithmic scale); while a categorical specification is used for the size of workplace (establishment). The region of residence was added to the controls. The purpose of this variable was to remove from our neighbourhood variable the variation, which was associated with a wider context of residence. The daily activity space of people reaches beyond residential neighbourhoods and workplaces often includes the entire city region.

Other controls in the models include immigrant generation (first, second or generation 1.5), detailed immigrant origin and educational attainment. The detailed origin distinguishes between the West (western Europe, the United States, Canada, Australia and New Zealand), Russia, Estonia, other Eastern European countries, Somalia, the Middle East, China, other Asian countries, other African countries and other countries elsewhere (mainly the various Latin-American countries). The control for education distinguishes between individuals who have low (ISCED 1–2), medium (ISCED 3–4) and high (ISCED 5–6) educational attainment.

5 | RESULTS

5.1 | Association with residential neighbourhood

The left panel in Table 3 presents the results from the proportional hazards models, which indicate the probability that immigrant-origin men and women will start their first union with a native partner. Estimates from the non-adjusted models (M1.1) reveal a relatively strong inverse relationship between the proportion of immigrants in the neighbourhood and their propensity to start unions with natives. For men who are living in areas in which the share of immigrants ranges from 5% to 9%, this can be associated with an 18% reduction in the hazard of becoming involved in an exogamous partnership when compared to the reference category (the share of immigrants being less than 5%). Among women, the effect is somewhat more pronounced (−33%). Larger proportions of immigrants are related to a further decrease in the risk of forming a mixed union.

The adjusted model (M1.2) includes controls for the size of residential neighbourhood, immigrant generation, country or region of origin, educational attainment and region of residence. Among men, the control for the effects of these variables results in only a marginal change in the hazard ratios for the proportion of immigrants in the neighbourhood. For women, the addition of controls moderately reduced the hazard ratio for the share of immigrants in the residential neighbourhood. However, despite the reduction in the hazard ratio, living in neighbourhoods with a higher share of immigrants is related to a significantly lower likelihood of the latter being able to start up an exogamous union with natives. A statistically significant effect persists even in areas with a relatively moderate proportion of immigrants (5% to 9%). This applies to men and women alike, with no marked gender difference in the adjusted model.

The estimates for endogamous unions between immigrants (in the right panel of Table 3) largely corroborate the findings discussed above. Unlike the results for exogamous partnerships, the models for endogamous unions reveal a positive gradient for our main independent variable. A higher proportion of immigrants in the neighbourhood is related to a statistically significant increase in their propensity to start their first union with an immigrant partner. The comparison of estimates obtained from adjusted and non-adjusted models shows that the inclusion of controls alters the effect only to a limited extent.

The opposite gradient in the hazard ratio for endogamous and exogamous unions lends support to the notion that any increase in the share of immigrants in residential neighbourhoods associates positively with the forming of endogamous unions between immigrants and negatively with the forming of exogamous unions with natives.

5.2 | Association with workplace

In the second set of models, the main independent variable is the share of immigrant coworkers at the person's place of work (Table 4). The estimates from non-adjusted models (M2.1) show a marked negative association between the proportion of coworkers of immigrant background and the likelihood of immigrants to partner with natives. Among men, being employed in an establishment in which the share of immigrants ranges from 5% to 9% of coworkers can be associated with a 21% reduction in the hazard ratio relative to the reference category. For women, the effect is closely similar (down by 25%). Larger proportions of employees of immigrant origin are related to decreased chances of entering mixed partnerships.

The inclusion of various controls in the model moderately reduces the effect for the main independent variable (M2.2). For instance, for workplaces with a share of immigrants of at least 15%, among men, the hazard ratio decreases from 51% in the initial model to 44% in the adjusted model and from 42% to 37% among women. However, notwithstanding the reduction, the adjusted estimates clearly suggest that the increase in the proportion of immigrant coworkers is associated with a marked decrease in the propensity to start a union with a native partner.

For endogamous partnerships between immigrants, the association runs in the opposite direction: the increase in the proportion of immigrants in the workplace is related to a higher propensity to

TABLE 3 Hazard ratios for the transition to exogamous and endogamous first unions by proportion of immigrants in residential neighbourhood, immigrant-origin population, Finland, birth cohorts 1981–1995

Proportion of immigrants in residential neighbourhood (%)	Exogamous unions with native partners				Endogamous unions between immigrants			
	Men		Women		Men		Women	
	M1.1	M1.2	M1.1	M1.2	M1.1	M1.2	M1.1	M1.2
0–4 (ref)	1	1	1	1	1	1	1	1
5–9	0.82***	0.79***	0.66***	0.77***	1.07**	1.09***	1.10***	1.10**
10–14	0.63***	0.64***	0.49***	0.62***	1.09***	1.13***	1.19***	1.19***
15+	0.48***	0.47***	0.38***	0.50***	1.13***	1.15***	1.27***	1.27***
Log likelihood	−23,706	−22,661	−17,875	−17,174	−33,653	−33,008	−24,126	−23,701

Note: General model specification: time at risk starts at age 18 or at arrival in Finland; censoring occurs at entry into a competing type of union, end of observation period, emigration or death. Model M1.1: process time (age) and proportion of immigrants in the residential neighbourhood. Model M1.2: process time (age) and proportion of immigrants in the residential neighbourhood, controlled for size of neighbourhood, immigrant generation, country or region of origin, educational attainment, and region of residence. *Source*: Finnish register data, authors' calculations.
*$p < 0.05$. **$p < 0.01$. ***$p < 0.001$.

TABLE 4 Hazard ratios for the transition to exogamous and endogamous first unions by proportion of immigrants in the workplace, immigrant-origin population, Finland, birth cohorts 1981–1995

	Exogamous unions with native partners				Endogamous unions between immigrants			
	Men		Women		Men		Women	
Proportion of immigrants at workplace (%)	M2.1	M2.2	M2.1	M2.2	M2.1	M2.2	M2.1	M2.2
0–4 (ref)	1	1	1	1	1	1	1	1
5–9	0.79***	0.81***	0.75***	0.79***	1.06	1.05	1.08	1.07
10–14	0.71***	0.76***	0.78***	0.83**	1.18***	1.13***	1.13*	1.10
15+	0.49***	0.56***	0.58***	0.63***	1.20***	1.11***	1.47***	1.38***
Log likelihood	−23,587	−22,570	−17,902	−17,094	−32,902	−32,436	−24,048	−23,676

Note: General model specification: see Table 3. Model M2.1: process time (age) and proportion of immigrants in the workplace. Model M2.2: process time (age) and proportion of immigrants in the workplace, controlled for the size of workplace, immigrant generation, country or region of origin, educational attainment and region of residence. *Source*: Finnish register data, authors' calculations.
*$p < 0.05$. **$p < 0.01$. ***$p < 0.001$.

initiate an endogamous union with an immigrant partner. Judging from the adjusted model (M2.2), immigrant men exhibit up to an 11% increase in the rate of entry into endogamous partnerships associated with highest proportion of immigrants in workplace. For women, the increase in the hazard ratio is even larger (up by 38%). The comparison of estimates obtained from the adjusted and non-adjusted models shows that, although the inclusion of controls into the models reduces the effect, the positive association between the share of immigrants in the workplace and the likelihood of forming an endogamous partnership persists in the adjusted model.

Similar to the results that have been found for residential neighbourhood, the opposite gradients for exogamous and endogamous unions indicate that the increase in the share of immigrants in the workplace tends to reduce intermarriage between natives and immigrants. Despite moderate gender differences, this pattern can be observed for immigrant men and women alike.

5.3 | Association with school attendance

The third set of models focus on the association between school attendance in the host country and union formation among immigrants. The models have two independent variables in order to clarify the relationship between union formation and educational attendance at compulsory and post-compulsory levels (Table 5).

The results indicate that compulsory education in the host country is related to a significantly higher likelihood of immigrants starting exogamous unions with native partners. According to estimates from the non-adjusted model (M3.1a), attendance for men in compulsory education in the host country is associated with a 78% increase in the hazard ratio relative to the reference category. For women, the effect is also rather strong (up by 56%).

The inclusion of controls into the model (M3.2) reduces the strength of the association between forming a union with a native, and of attendance in compulsory education in the host country, with the hazard ratio decreasing to 45% both for men and women.

The association between attendance in post-compulsory education in the host country and entry into exogamous partnerships tends to follow a similar pattern, but the effect appears less pronounced. In the non-adjusted model (M3.1b), the hazard ratios amount to reach 23% for men and 38% for women. After adjustment for the influence of other factors, attendance for immigrant women in post-compulsory education in the host country is related to a 17% higher likelihood of their forming an exogamous union with a native partner. For men, the association is statistically insignificant. A stepwise inclusion of variables into the model (not shown in Table 5) reveals that controls for the effects of other education-related variables make up the largest contribution to the reduction in hazard ratios for post-compulsory education in the adjusted model.

The results for endogamous partnerships among immigrants corroborate the findings that have been reported above. The model estimates reveal a systematically negative association between attendance in compulsory education and the propensity to form endogamous unions with immigrant partners. In the adjusted model (M3.2), men and women who attended compulsory education in the host country show a 36% lower likelihood of starting an endogamous partnership than does the reference group. A more moderate but statistically significant association exists between entry rate into endogamous partnerships in Finland and attendance in post-compulsory education. For immigrant men, the decrease in the adjusted hazard ratio is at 8%; for immigrant women, the reduction is slightly larger (down by 13%).

5.4 | Neighbourhoods, workplaces and school attendance considered jointly

In the previous sections, the association between union formation and the share of immigrants in residential neighbourhoods and workplaces and school attendance in the host country was all modelled separately. However, contact between immigrants and natives in the various life domains does not occur in isolation. It can be assumed that developments in each domain are related to exogamous and endogamous partnerships, not only directly but also through the influence of other domains; working in a less immigrant-dense workplace, living in a less immigrant-dense neighbourhood or having studied in Finland are all to some extent related to each other. In order to provide an insight into how the effect of neighbourhoods, workplaces and educational attendance can come together, we estimated additional models in which the three domains were considered jointly.

The models (Table 6) do not suggest much multi-collinearity between the domain variables, as the hazard ratios for our main independent variables are only moderately altered when compared to the results that were reported in preceding sections. Notably, none of the associations between domain and union formation loses significance when modelled jointly. For exogamous partnerships, the largest reduction in the hazard ratio was limited to 6%, something which was observed both for men and women who are employed in workplaces with a relatively high share of immigrant coworkers.

For endogamous unions, changes in the hazard ratios are also rather limited, but the direction of change varies across domains. When compared to the estimates that have been obtained from separate models, the association between attending post-compulsory education in the host country and union formation becomes slightly larger in the joint model. The association between the proportion of immigrants in the residential neighbourhood and union formation also increases in the joint model, whereas the hazard ratios for the association between the share of immigrants in workplaces and union formation shift slightly in the opposite direction. The estimates for control variables are presented in the appendix (Table A3).

Overall, estimates that have been based on the joint model lend additional support to the notion that the ethnic makeup of the population in all three domains being considered in this study is related to patterns of partnership formation for immigrants. Lessened exposure to immigrants in residential neighbourhoods and workplaces and school attendance in the host country are all found to be positively

TABLE 5 Hazard ratios for the transition to exogamous and endogamous first unions by educational attendance in host country, immigrant-origin population, Finland, birth cohorts 1981–1995

	Exogamous unions with native partners				Endogamous unions between immigrants			
	Men		Women		Men		Women	
Educational attendance in host country	M3.1[a,b]	M3.2	M3.1[a,b]	M3.2	M3.1[a,b]	M3.2	M3.1[a,b]	M3.2
Compulsory								
No (ref)	1	1	1	1	1	1	1	1
Yes	1.78***	1.45***	1.56***	1.45***	0.59***	0.64***	0.57***	0.64***
Post-compulsory								
No (ref)	1	1	1	1	1	1	1	1
Yes	1.23***	1.04	1.38***	1.17***	0.93***	0.92***	0.80***	0.87***
	−23,783		−18,149		−33,474		−23,907	
Log likelihood	−23,950	−22, 805	−18,204	−17,258	−33,658	−33,064	−24,114	−23,667

Note: General model specification: see Table 3. Model M3.1[a]: process time (age) and attendance in compulsory education. Model M3.1[b]: process time (age) and attendance in post-compulsory education. Model M3.2: process time (age), attendance in compulsory and post-compulsory education, controlled for immigrant generation, country or region of origin, educational attainment and region of residence. *Source*: Finnish register data, authors' calculations.

*$p < 0.05$. **$p < 0.01$. ***$p < 0.001$.

TABLE 6 Hazard ratios for the transition to exogamous and endogamous first unions by the proportion of immigrants in neighbourhood and workplace, and educational attendance in the host country, immigrant-origin population, Finland, birth cohorts 1981–1995

	Exogamous unions		Endogamous unions	
	Men	Women	Men	Women
Domains	M4	M4	M4	M4
Proportion of immigrants in neighbourhood (%)				
0–4 (ref)	1	1	1	1
5–9	0.80***	0.77***	1.12***	1.10**
10–14	0.65***	0.62***	1.15***	1.20***
15+	0.49***	0.51***	1.19***	1.29***
Proportion of immigrants in the workplace (%)				
0–4 (ref)	1	1	1	1
5–9	0.85***	0.82***	1.05	1.06
10–14	0.81***	0.89*	1.13***	1.09
15+	0.62***	0.69***	1.09**	1.32***
Compulsory education in host country				
No (ref)	1	1	1	1
Yes	1.46***	1.40***	0.63***	0.63***
Post-compulsory education in host country				
No (ref)	1	1	1	1
Yes	1.02	1.13***	0.83***	0.81***
Log likelihood	−22,312	−16,911	−32,225	−23,475

Note: General model specification: see Table 3. Model M4: process time (age), proportion of immigrants in the neighbourhood and workplace, attendance in compulsory and post-compulsory education, controlled for the size of neighbourhood, the size of workplace, immigrant generation, country or region of origin, educational attainment and region of residence. *Source*: Finnish register data, authors' calculations.
*$p < 0.05$. **$p < 0.01$. ***$p < 0.001$.

associated with the likelihood that immigrants start up exogamous unions with natives. By contrast, increased exposure to immigrants in neighbourhoods and workplaces, and non-attendance in education in the host country, tends to be positively related to the formation of endogamous unions among immigrants, even if their share in the local setting is moderate. The limited change in hazard ratios in the joint model, relative to separate models, suggests that each domain's association with union formation is largely independent of that of other domains.

5.5 | Differences associated with immigrant origins

In this section, we examine whether the relationship between the share of immigrants in residential neighbourhoods and workplaces and school attendance in the host country varies according to the origins of the immigrants (in terms of expressing their cultural distance from the host society). In order to get an answer, we distinguished between immigrants of western and non-western origins and interacted our main independent variables with that of immigrant origin, doing this separately for each domain. In the interaction models, the variables for residential neighbourhood and workplace reflect low group-specific proportions of immigrants (below 10%) and high proportions (10% or above) (see Table 7).

The estimates for exogamous unions show that, for immigrants both of western and non-western origins, their higher proportion in neighbourhoods and workplaces is associated with a noticeable decrease in the likelihood of their partnering with natives. For differences between immigrant groups, the hazard ratios for the two middle categories of the independent variables are the most informative. Among men, immigrants of western origin exhibit a somewhat larger reduction of the hazard ratio for starting an exogamous union associated with the higher share of their group (down by 46% for neighbourhoods and down by 38% for workplaces, relative to the reference category) than do non-western men (down by 44% and down by 17%, respectively). Western women also exhibit a slightly larger decrease in the hazard ratio (−32%), associated with the higher share of their group in the neighbourhood than women who are of a non-western origin (−28%). However, effects associated with their elevated share in the workplace are closely similar for both groups of immigrant women (showing a decrease of between 18% and 19%).

As can be expected, for both groups, the elevated share of own-group members in neighbourhoods and workplaces is related to a higher likelihood of them forming endogamous partnerships between immigrants. However, the patterns for endogamous unions appear to be somewhat less systematic than those that can be found for exogamous unions. In particular, for men, in most cases, a higher proportion of own-group-immigrants shows no significant association with the

TABLE 7 Interaction for the proportion of immigrants in neighbourhood and workplace, and immigrant origin, for the transition to exogamous and endogamous first unions, immigrant-origin population, Finland, birth cohorts 1981–1995

	Exogamous unions with native partners				Endogamous unions between immigrants			
	Men		Women		Men		Women	
Proportion of immigrants by origin	Western	Non-western	Western	Non-western	Western	Non-western	Western	Non-western
The effect of the proportion of immigrants in neighbourhoods by origin (M5.1)								
Both groups low	1	1	1	1	1	1	1	1
High W., low non-W.	0.54***	0.81*	0.68***	0.67**	1.20	1.24	1.15**	1.10
Low W., high non-W.	0.69***	0.56***	0.74***	0.72**	1.07	0.97	1.32***	1.14*
Both groups high	0.50***	0.70***	0.68***	0.53***	1.12	0.98	1.25***	1.09†
The effect of the proportion of immigrants at workplaces by origin (M5.2)								
Both groups low	1	1	1	1	1	1	1	1
High W., low non-W.	0.62***	1.03	0.82***	1.24†	1.20***	0.94	1.24***	1.01
Low W., high non-W.	0.83	0.83***	0.93	0.81*	0.99	0.93	0.90	1.09
Both groups high	0.81***	0.87**	0.71***	0.81†	1.24***	0.96	1.48***	1.31***

Note: General specification: see Table 3. Western origin refers to the countries of Europe, the United States, Canada, Australia and New Zealand. Non-western origin refers to all other countries. Model M5.1: process time (age) and interaction between immigrant origin and the proportion of immigrants in the residential neighbourhood. Model M5.2: interaction between immigrant origin and the proportion of immigrants in the workplace neighbourhood. Both models are controlled for the proportion of immigrants in the neighbourhood (M5.2) or workplace (M5.1), the size of the neighbourhood and workplace, attendance in compulsory and post-compulsory education, immigrant generation, educational attainment and region of residence. *Source*: Finnish register data, authors' calculations.

†$p < 0.10$. *$p < 0.05$. **$p < 0.01$. ***$p < 0.001$.

TABLE 8 Interaction of educational attendance in the host country, and immigrant origin for the transition to exogamous and endogamous first unions, immigrant-origin population, Finland, birth cohorts 1981–1995

	Exogamous unions with native partners				Endogamous unions between immigrants			
	Men		Women		Men		Women	
	School attendance in the host country		School attendance in the host country		School attendance in the host country		School attendance in the host country	
Immigrant origin	No	Yes	No	Yes	No	Yes	No	Yes
The effect of attending compulsory education by origin (M6.1)								
Western	1	1.70***	1	1.59***	1	0.52***	1	0.55***
Non-western	1	1.20***	1	0.97	1	0.77***	1	0.75***
The effect of attending post-compulsory education by origin (M6.2)								
Western	1	1.08*	1	1.26***	1	0.83***	1	0.76***
Non-western	1	0.97	1	0.91	1	0.82***	1	0.92*

Note: General specification: see Table 3. Western origin refers to the countries of Europe, the United States, Canada, Australia and New Zealand. Non-western origin refers to all other countries. Model M6.1: process time (age) and interaction of immigrant origin and attendance in compulsory education in the host country. Model M6.2: process time (age) and interaction of immigrant origin and attendance in post-compulsory education in the host country. Both models are controlled for the proportion of immigrants in the neighbourhood and workplace, the size of the neighbourhood and workplace, attendance in compulsory (M6.2) or post-compulsory education (M6.1), immigrant generation, educational attainment and region of residence.
Source: Finnish register data, authors' calculations.

*$p < 0.05$. **$p < 0.01$. ***$p < 0.001$.

chance of starting an endogamous union. Our analysis does not provide a direct clue as to which specific factors may underlie this departure from the overall pattern.

The results that have been obtained from the interaction models for school attendance (Table 8) indicate that attendance in compulsory education in the host country is positively related to the

likelihood of starting an exogamous union with a native partner. This association, however, varies according to origin, being stronger for immigrants who are of western origin. Men and women of western origin display a 70% and 59% increase, respectively, in the hazard ratio associated with compulsory education in the host country. By contrast, non-western men exhibit only a 20% increase, and for non-western women, compulsory education in the host country is not at all associated with starting an exogamous partnership with a native partner. The results for endogamous partnerships are more similar for immigrants who are of different origin: for both groups, attendance at school in the host country at the compulsory level is related to a markedly reduced chance of partnering with an immigrant. However, this association is stronger for Western-origin immigrants than it is for non-western immigrants.

The results for post-compulsory education corroborate the pattern that has been found for compulsory schooling, although the associations are weaker. A statistically significant positive increase in the hazard of partnering with natives associated with post-compulsory education in the host country can only be observed in immigrants who are of a western origin. Attendance in post-compulsory education is negatively associated with the propensity to start a union with an immigrant partner, both for western and non-western immigrants, but the association tends to be stronger for the former group.

To sum up, our findings for immigrant origin reveal both similarities and differences in the association between union formation and the proportion of immigrants in the three domains: residential neighbourhoods, workplaces and school attendance in the host country. This lends support to the coexistence of some overall pattern, one that is shared by all immigrant groups and group-specific features that are reflected in the variation of the association between immigrants who are of different origin.

5.6 | Differences associated with an immigrant generation

To be able to ascertain whether the association between union formation and the proportion of immigrants in residential neighbourhoods and workplaces does vary across immigrant generations, additional interaction models were estimated. In these models, we distinguished between first-, 1.5-, and second-generation immigrants. Educational attendance was not considered because only a small fraction of the first-generation immigrants attend educational courses in the host country while the opposite holds for 1.5- and second-generation immigrants.

The results show a similar pattern for residential neighbourhoods and workplaces (Table 9). In both domains, the relationship between the proportion of immigrants and the likelihood of forming an exogamous union with a native partner grows stronger over immigrant generations. Among men, the hazard ratio associated with a high share of immigrants in the neighbourhood increases from −36% in the first generation to −48% in the second generation. Among women, the increase in the hazard ratio is even larger (from −29% in the first generation to −49% in the second generation). In workplaces, the association changes relatively little over generations for men, while the change in hazard ratio is much larger for women (from −10% among first-generation immigrants to −40% among second-generation immigrants). The hazard ratios for generation 1.5 fall between the first and

TABLE 9 Interaction of the proportion of immigrants in neighbourhood and workplace, and immigrant origin for the transition to exogamous and endogamous first unions, immigrant-origin population, Finland, birth cohorts 1981–1995

	Exogamous unions with native partners				Endogamous unions between immigrants			
	Men		Women		Men		Women	
	Proportion of immigrants		Proportion of immigrants		Proportion of immigrants		Proportion of immigrants	
Generation	Low	High	Low	High	Low	High	Low	High
The effect of the proportion of immigrants in neighbourhoods by generation (M7.1)								
2nd generation	1	0.52***	1	0.51***	1	1.33	1	1.32*
1.5 generation	1	0.68***	1	0.66***	1	1.15***	1	1.20***
1st generation	1	0.64***	1	0.71***	1	1.06***	1	1.14***
The effect of the proportion of immigrants in workplaces by generation (M7.2)								
2nd generation	1	0.68**	1	0.60***	1	1.43	1	1.42†
1.5 generation	1	0.80***	1	0.85**	1	1.14**	1	1.18**
1st generation	1	0.74***	1	0.90†	1	1.04	1	1.19***

Note: General specification: see Table 2. Model M7.1: interaction between immigrant generation and the proportion of immigrants in residential neighbourhoods. Model M7.2: process time (age) and interaction between immigrant generation and the proportion of immigrants in the workplace. Both models are controlled for the proportion of immigrants in the neighbourhood (M7.2) and workplace (M7.1), the size of the neighbourhood and workplace, attendance in compulsory and post-compulsory education, country or region of origin, educational attainment and region of residence. *Source*: Finnish register data, authors' calculations.

†$p < 0.10$.

*$p < 0.05$. **$p < 0.01$. ***$p < 0.001$.

second generations, with the exception of men in the workplace model. The estimates for endogamous partnerships tend to corroborate the pattern reported above.

Our findings thus suggest that the association between the proportion of immigrants in residential neighbourhoods and workplaces and union formation does not lose its relevance for partnership outcomes among immigrants who arrived to the host country as children, or with the descendants of immigrants. Interestingly, the association between exogamous unions and a higher share of immigrants in neighbourhoods and workplaces tends to be stronger rather than weaker in the second generation relative to generation 1.5- and first-generation immigrants. We suspected that this finding could be driven by selection, with generation 1.5- and second-generation immigrants being generally less likely to reside in the same neighbourhoods or to work in those establishments, which have a higher proportion of immigrants than did their counterparts of the first generation. However, this assertion was not supported by the data. In Finland, the distribution of first-, 1.5-, and second-generation immigrants appears rather similar across neighbourhoods and workplaces, which have a different share of immigrants.

6 | CONCLUSIONS AND DISCUSSION OF THE FINDINGS

To understand patterns of partnering behaviour, researchers often use the metaphor of the market. Guided by recent advancements in segregation research and the time geographic perspective, the key contribution of this paper is to extend research on marriage markets from national, regional and city levels to multiple daily spatial contexts or life domains—neighbourhoods, workplaces and schools—which are denoted here as local marriage markets. Along with the growth of immigrant populations, the ethnic diversity of residential neighbourhoods, workplaces and schools has grown in the host countries, but there is as yet very little research on the role of the ethnic makeup of the immediate daily contexts in the formation of mixed ethnic unions. The competing theoretical views suggest that exposure to natives may either elevate or reduce the probability of the formation of mixed ethnic unions for immigrants. Based on register data from Finland, we distinguished between two types of partnerships for persons of immigrant origin: exogamous unions (the partner is a native Finn) and endogamous unions (both partners are of immigrant origin). The key findings for our research questions are as follows.

We started out with a separate analysis of the association of each life with union formation. There is a relatively strong inverse relationship between the proportion of immigrants in the neighbourhood and workplaces, and their propensity to start unions with natives. The results remain largely unchanged after adding relevant controls; that is, living in neighbourhoods and working in establishments that have a higher share of immigrants is negatively associated with the likelihood of the latter starting exogamous unions with natives. These findings apply to men and women alike, with no substantial gender difference in the adjusted model. Compulsory education in the host country is positively associated with the likelihood of immigrants to start exogamous unions with native partners. A positive association was also found for post-compulsory education, but for men, it became weaker in the model, which applied all of the controls. Hence, somewhat surprisingly, studying together with native peers is less consistently related to the formation of mixed ethnic unions than is having native neighbours and coworkers, especially for immigrant men. This implies that further research is required in order to better understand how different domain-specific factors may relate to union formation.

Contact between immigrants and natives in different life domains does not occur in isolation but may be influenced by concurrent developments in other domains. We therefore proceeded with a joint analysis of the associations between all domains and with union formation. The main findings of the joint analysis indicate that hazard ratios for our main independent variables—the share of immigrants in residential neighbourhoods and workplace establishments, and having a compulsory education in Finland rather than elsewhere—are only moderately altered when compared to estimates, which have been obtained from models run separately for each domain. These findings lend support to the notion that all three domains considered in this study are associated with the partnership formation of immigrants. More specifically, higher exposure to natives in residential neighbourhoods and workplaces, and school attendance in the host country, all relates to a higher probability that immigrants may start up mixed-ethnic unions with natives. And by contrast, increased exposure to immigrants in neighbourhoods and workplaces, along with non-attendance in education in the host country, corresponds to a greater probability of forming endogamous unions among immigrants, even if their share in the local population is relatively small.

The findings are consistent across broad immigrant origin groups when it comes to ethnic residential and workplace contexts. In other words, the higher the proportion of natives in neighbourhoods and workplaces, the greater is the likelihood of finding a native partner among immigrants of both western and non-western origins. However, results differ when it comes to educational attendance in the host country. The association is stronger for western immigrants, men and women alike. For non-western immigrants, having attended compulsory education in the host country is moderately related to finding a native partner only for women. Our findings regarding the immigrant generation are at odds with the expectation that the association between the ethnic composition of the local marriage market and union formation becomes weaker from the first generation to later generations of immigrants. The positive association between forming endogamous unions and higher concentrations of immigrants in neighbourhoods and workplaces tends to be stronger rather than weaker in generation 1.5, and even stronger for the second generation. Our analysis did not reveal differences in the ethnic makeup of neighbourhoods and workplaces for the first- or second-generation immigrants, or for generation 1.5 either. This suggests that opportunities to meet natives and other immigrants in different local marriage markets do not vary between immigrant generations. However, a further study of selection mechanisms is needed because it may be the case that different natives settle into immigrant-dense

neighbourhoods and workplaces over time. For example, higher income households with school-age children are more prone to leave and avoid immigrant-dense neighbourhoods in Finland (Bernelius et al., 2021; Bernelius & Vilkama, 2019).

One of the major limitations in our research design is that the key variables—the ethnic composition of different life domains—can be seen as being mere proxies for variations in attitudes towards ethnically mixed unions rather than evidence of actual encounters between immigrants and natives on the local marriage markets. To seek support for our interpretation of the results, we constructed an additional variable that served to indicate whether future partners shared the same neighbourhood, workplace or school during the time in which there was a chance of union formation. The results show that 36% of immigrant women and 30% of immigrant men who started an inter-ethnic union with a native Finn lived in the same neighbourhood, worked in the same establishment or studied in the same school as their future partner for some period prior to union formation. For native Finns who partnered with immigrants, the percentages are even higher, totalling 39% for men and women alike. Although information from the register does not make it possible to ascertain whether partners actually met in the neighbourhood, workplace or school, encounters in the local marriage market are plausible. With this fact in hand, our study underscores the importance of clarifying in future research the role of different mechanisms—such as opportunities to meet partners outside one's own group or shaping the mindsets of people towards ethnically-mixed unions—through which local marriage markets can influence partnership formation.

Despite these limitations, for the first time, our results present overall patterns of associations between union formation and the proportion of immigrants in residential neighbourhoods, workplaces and school attendance in the host country, based on the full population of a country. To conclude, our findings show that the immediate spatial context that immigrants experience in different life domains—in residential neighbourhoods, workplaces and schools—is significantly related to the formation of mixed ethnic unions between immigrants and natives. These findings hold true when analysing each domain separately and jointly. With a few exceptions, the findings are consistent across genders and immigrant origin groups. For neighbourhoods and workplaces, the effects do not fade but instead strengthen when moving beyond first-generation immigrants. In short, our results lend support to the notion that higher exposure to out-of-group members can reduce prejudice and hence facilitate inter-ethnic partnerships, but not necessarily to the same extent for groups of different origin.

Our findings point to a number of important directions for future research. First, more research is required in relation to how exposure to ethnic diversity is linked to inter-group preferences towards both exogamous and endogamous unions and to what degree people actually find partners among their neighbours, work colleagues and fellow students. Second, the role of education as it is acquired in the host country differs according to different immigrant origins. For non-western immigrants, the association is weaker for women and insignificant for men, relative to their counterparts who are of western origin. Schools are places of intense social interaction, and how this interaction affects the attitudes of immigrant children towards forming a partnership with natives therefore needs further research. Third, there is a need for more detailed study across the immigrant generation. Our research does not lend support to the straight-line assimilation hypothesis; that is, that ethnic integration deepens with each consecutive generation, meaning that alternative explanations need to be sought out in order to better understand the persistence of the role of ethnic context in relation to the formation of mixed ethnic unions for different immigrant generations. Fourth, research is also required regarding the role of online meetings in terms of mixed union formation. Recent studies (Potarca, 2017; Thomas, 2020) show that meeting online is linked to lower couple endogamy than is having school, family, friends or religious venues as intermediaries. However, research also shows that online and physical social interactions are mutually related to each other: physical proximity fosters online meetings, and online interaction facilitates physical meetings (Silm et al., 2021). Hence, future research on mixed-union formation needs to shed more light on the various physical domains, on online meeting between people and on how physical and online meeting could be related to each other. Finally, in order to be able to generalise the results, it is recommended that this type of research be extended into other settings for which appropriate data on spatial context or the life domains of immigrants could be available.

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CONFLICT OF INTEREST

The authors declare that they have no conflict of interest.

ENDNOTES

[1] Those countries listed have more than 10,000 first- and second-generation immigrants (2017).

[2] Our definition of endogamous partnerships includes those unions in which both partners are migrants (i.e., not of Finnish origin), regardless of their ethnic group. As our main focus is on the integration of immigrants into the host society, and the fact that the share of unions between migrants of different ethnic origins was relatively small, we did not treat unions between migrants of different origin as a separate type of union.

[3] Here, being of a western origin refers to all of the European states (including neighbouring Russia and Estonia, as well as other Eastern European countries, which were differentiated in a detailed classification of origin), along with the United States, Canada, Australia and New Zealand. Partners from other countries or regions were included in the alternative group (those of a non-western origin). Given the relatively small numbers of immigrants from most countries, a more detailed disaggregation was not feasible.

[4] Additional information about exposure time and events can be found in Tables A1 and A2.

[5] Depending upon the specific analytical step, we apply different modes of operation for the proportion of immigrants: the share of all migrants and group-specific shares of migrants who are of a western or non-western origin.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study is derived from the dataset that covers the whole population of Finland for 2004–2014 constructed by Statistics Finland (contract TK-52-1417-16).

ORCID

Allan Puur https://orcid.org/0000-0002-6900-9842
Leen Rahnu https://orcid.org/0000-0003-1327-7888
Tiit Tammaru https://orcid.org/0000-0003-1590-1269

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APPENDIX A.

TABLE A1 Person years of observation and the number of endogamous and exogamous first unions, immigrant-origin population, Finland, birth cohorts 1981–1995

	Men			Women		
Variables and categories	**Person years**	**Endogamous**	**Exogamous**	**Person years**	**Endogamous**	**Exogamous**
Total	190,973	12,494	7,330	110,095	8,957	5,946
Immigrant generation						
2nd generation	6,098	124	379	5,127	235	415
1.5 generation	62,203	2,815	2,938	48,327	3,517	2,942
1st generation	122,672	9,555	4,013	56,641	5,205	2,589
Immigrant origin						
Western origin						
West	16,265	575	1,491	9,748	401	804
Russia	37,622	2,612	1,430	29,223	2,341	1,987
Estonia	29,869	1,905	1,047	17,567	1,475	1,164
Other eastern European	17,335	1,347	597	9,265	929	458
Non-western origin						
Somalia	11,270	657	124	7,756	627	58
Middle East	32,202	1,847	996	11,968	1,112	216
China	8,128	751	177	6,468	593	282
Other Asian countries	23,108	1,818	696	10,990	946	625
Other African countries	13,111	871	580	5,728	463	218
Other countries	2,063	111	192	1,382	70	134
Proportion of immigrants in neighbourhood						
0%–4%	41,515	2,444	2,187	22,819	1,602	2,009
5%–9%	56,521	3,674	2,454	32,366	2,524	1,884
10%–14%	37,785	2,514	1,274	21,839	1,836	938
15+%	55,152	3,862	1,415	33,071	2,995	1,115
Proportion of immigrants at workplace						
0%–4%	11,160	852	875	8,487	610	858

(Continues)

TABLE A1 (Continued)

Variables and categories	Men			Women		
	Person years	Endogamous	Exogamous	Person years	Endogamous	Exogamous
5%–9%	12,809	1,034	787	8,129	631	617
10%–14%	10,228	937	566	6,635	540	534
15+%	57,914	5,610	2,143	25,239	2,641	1,450
Student	25,147	1,077	948	18,834	1,529	967
Other/status unknown	73,715	2,984	2,011	41,771	3,006	1,520
Educational attainment						
Low (ISCED 1–2)	127,898	8,298	4,139	61,582	5,413	2,681
Medium (ISCED 3–4)	44,401	2,524	2,295	34,506	2,400	2,288
High (ISCED 5+)	18,674	1,672	896	14,007	1,144	977
Region of residence						
Helsinki	93,734	6,288	3,424	59,300	4,955	2,601
Turku	23,729	767	491	7,595	632	333
Tampere	11,179	702	495	5,692	455	412
Other areas	73,331	4,737	2,920	37,508	2,915	2,600
Compulsory education in Finland						
No	44,254	1,679	2,497	34,650	2,181	2,494
Yes	146,719	10,815	4,833	75,445	6,776	3,452
Post-compulsory education in Finland						
No	86,189	6,432	2,771	39,364	3,509	1,633
Yes	104,784	6,062	4,559	70,731	5,448	4,313
Size of workplace						
1–4	13,939	1,347	599	5,272	498	376
5–30	27,769	2,537	1,329	15,202	1,345	1,201
31–100	16,610	1,455	827	10,169	864	723
100+	33,793	3,094	1,616	17,847	1,715	1,159

Note: *Source*: Finnish register data, authors' calculations.

TABLE A2 Person years of observation and the number of endogamous and exogamous first unions, immigrant-origin population of western and non-western origin, Finland, birth cohorts 1981–1995

Variables and categories	Western origin			Non-western origin		
	Person years	Endogamous	Exogamous	Person years	Endogamous	Exogamous
Men						
Total	101,091	6,39	4,565	89,882	6,055	2,765
Immigrant generation						
2nd generation	2,931	38	262	3,167	86	117
1.5 generation	38,178	1,627	2,147	24,025	1,188	791
1st generation	59,982	4,774	2,156	62,690	4,781	1,857
Proportion of immigrants in neighbourhood						
0%–4%	47,973	2,835	2,681	42,762	2,821	1,585
5%–9%	36,093	2,337	1,437	30,599	2,059	808
10%–14%	11,542	873	308	12,409	887	290
15+%	5,483	394	139	4,112	288	82
Proportion of immigrants at workplace						
0%–4%	10,082	705	867	8,418	730	409
5%–9%	9,194	759	572	6,597	634	270
10%–14%	5,586	513	368	4,501	419	202
15+%	25,907	2,679	974	21,826	1,994	709
Student	11,309	395	548	13,838	682	400
Other/status unknown	39,013	1,388	1,236	34,702	1,596	775
Compulsory education in Finland						
No	26,344	951	1,828	17,910	728	669
Yes	74,747	5,488	2,737	71,972	5,327	2,096
Post-compulsory education in Finland						
No	51,797	3,986	1,846	34,392	2,446	925
Yes	49,294	2,453	2,719	55,490	3,609	1,840
Size of workplace						
1–4	8,308	827	382	5,631	520	217
5–30	18,134	1700	920	9,635	837	409
31–100	9,333	800	527	7,277	655	300
100+	14,994	1329	952	18,799	1,765	664
Women						
Total	65,803	5,146	4,413	44,292	3,811	1,533
Immigrant generation						
2nd generation	2,570	98	307	2,557	137	108
1.5 generation	29,898	1,985	2,395	18,429	1,532	547
1st generation	33,335	3,063	1,711	23,306	2,142	878
Proportion of immigrants in neighbourhood						
0%–4%	29,982	2,085	2,649	20,530	1,683	925
5%–9%	24,154	1,984	1,251	15,627	1,355	430
10%–14%	8,101	753	355	6,198	605	152
15+%	3,566	324	158	1,937	168	26
Proportion of immigrants at workplace						
0%–4%	8,090	584	839	4,833	403	310
5%–9%	6,908	526	587	3,331	301	156
10%–14%	4,392	389	392	2,105	186	89
15+%	12,827	1,361	820	6,004	672	266

(Continues)

TABLE A2 (Continued)

Variables and categories	Western origin			Non-western origin		
	Person years	Endogamous	Exogamous	Person years	Endogamous	Exogamous
Men						
Student	10,618	726	693	9,216	803	274
Other/status unknown	22,968	1,560	1,082	18,803	1,446	438
Compulsory education in Finland						
No	20,785	1,177	1,990	13,865	1,004	504
Yes	45,018	3,969	2,423	30,427	2,807	1,029
Post-compulsory education in Finland						
No	24,729	2,267	1,201	14,635	1,242	432
Yes	41,074	2,879	3,212	29,657	2,569	1,101
Size of workplace						
1–4	3,732	342	289	1,540	156	87
5–30	10,546	920	969	4,656	425	232
31–100	6,524	528	531	3,645	336	192
100+	11,415	1,070	849	6,432	645	310

Note: *Source*: Finnish register data, authors' calculations.

TABLE A3 Hazard ratios for control variables for the transition to exogamous and endogamous first unions, immigrant-origin population, Finland, birth cohorts 1981–1995

	Exogamous unions		Endogamous union	
	Men	Women	Men	Women
Control variable	**M4**	**M4**	**M4**	**M4**
Immigrant generation				
2nd generation	1.27***	1.16*	0.65***	0.74***
1.5 generation	1.31***	1.04	0.92***	0.92**
1st generation	1	1	1	1
Immigrant origin				
West	3.23***	1.40***	0.41***	0.48***
Russia	1	1	1	1
Estonia	1.14**	1.07†	0.70***	0.94*
Other east European countries	1.03	0.76***	0.93*	1.23***
Somalia	0.39***	0.16***	1.13***	0.97
Middle East	1.08†	0.31***	0.79***	1.18***
China	0.73***	0.77***	1.16***	1.02
Other Asian countries	1.00	0.93	0.91***	1.04
Other African countries	1.75***	0.72***	0.66***	0.88*
Other countries	3.12***	1.64***	0.64***	0.63***
Educational attainment				
Low (ISCED 1–2)	0.87***	0.98	0.89***	1.10***
Medium (ISCED 3–4)	1	1	1	1
High (ISCED 5+)	1.15**	1.31***	1.09*	1.10*
Region of residence				
Helsinki	1	1	1	1
Turku	0.91*	0.93	1.06	1.04
Tampere	1.00	1.31***	1.00	1.04
Other areas	0.84***	1.14***	0.92***	0.93*
Size of neighbourhood (ln)	0.98**	0.97*	0.91***	0.92***
Size of workplace				
1–4	1	1	1	1
5–30	0.94	0.98	0.98	1.03
31–100	0.82***	0.86**	1.02	1.04
100+	0.77***	0.80***	1.03	1.17**

Note: General specification: see Table 2. The estimates for main independent variables are presented in Table 5. *Source*: Finnish register data, authors' calculations.
***$p < 0.001$. **$p < 0.01$. *$p < 0.05$ †$p < 0.10$.