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Parental age gaps among immigrants and their descendants: Adaptation across time and generations?

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Age gaps between partners have undergone dramatic changes in high-income countries over the past century. Yet, there has been little focus on age gaps for immigrants and their descendants. This is an important omission because age gaps can be interpreted as a macro-level indicator of intergenerational adaptation. We examine the age gaps of biological parents (childbearing partners) among immigrants and their descendants in Sweden, a country with high gender equality and a stable mean age gap. Using longitudinal, whole-population data, we examine changes in age gaps for cohorts born 1950–86. Cohort trends in age gaps often follow very different patterns for male and female immigrants, with limited evidence of adaptation across cohorts. However, there is considerable evidence of adaptation towards the Swedish norm among the second generation, including from direct comparison between immigrants and their children. The largest differences between women and men are seen among the first generation with a Swedish-born partner.

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Keywords: age difference; partnership; adaptation; immigrants; descendants of immigrants; intermarriage; binational partnership

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Introduction

The difference in age between partners is both a cause and a consequence of socio-demographic behaviour. Age gaps in childbearing relationships are determined not only by partner choice but by trends in union formation and dissolution (i.e. partnership markets) (Ní Bhrolcháin 1992). It has been argued that opposite-sex unions between a woman and a man who is significantly older (by more than a couple of years) are associated with lower gender equality and more traditional family values (Atkinson and Glass 1985; Van De Putte et al. 2009) and that such relationships are associated with adverse well-being for women (Barbieri and Hertrich 2005). In addition to the potential consequences of age gaps on division of labour within unions (e.g. trade-offs between labour market and childrearing activities), age gaps also have repercussions beyond childbearing ages since they impact retirement timing (Kridahl and Kolk 2018) and longevity (Drefahl 2010). Thus, it can be argued that, on an aggregate level, age gaps can be both a cause and a consequence of values and norms related to families and gender.

Since the nineteenth century, average age differences between male and female partners have decreased steadily and are now just a couple of years in the majority of Western industrialized countries (van Poppel et al. 2001; Wilson and Smallwood 2008; Esteve et al. 2009; Kolk 2015). With greater gender equality, a decrease in the gendered division of labour, and fewer instrumental reasons for entering a marriage or long-term union, the grounds for choosing a given partner are now more similar for women and men (Shorter 1975). Alongside these social trends, many high-income countries—including Sweden—have become home to an increasing number of immigrants from diverse countries. Many of these emigrated from countries with different norms and preferences regarding the age of prospective partners, but even for those from countries with similar norms, immigrants may have different norms due to selection. If age gaps are indicative of changes in partner

choice and correlate with underlying partner preferences and norms, then research on the age gaps of immigrants and their descendants is an important means of understanding behavioural adaptation of family formation behaviour. Moreover, as the size and share of the foreign-born population increases, the partnership behaviour of immigrants becomes an increasingly important component of partnership dynamics for the destination population as a whole. It is therefore surprising that there is a lack of research on age gaps among immigrants (cf. Berrington 1994; Balistreri et al. 2017), especially as compared with their descendants.

Here we address this research deficit. Our central aim is to establish whether there is adaptation of age gaps across time and generations. Specifically, we seek to identify how age gaps within childbearing unions have changed for immigrants and their descendants by birth cohort (across time) and by comparing first-generation immigrants with the second generation (across generations), including a direct comparison between immigrants and their children. There is a considerable body of research on the adaptation (or assimilation/acculturation) of family behaviours, including fertility (e.g. Andersson 2004; Parrado and Morgan 2008) and different types of partnership formation and dissolution (e.g. Milewski and Kulu 2014; Andersson et al. 2015), but we are not aware of any research focusing on the adaptation of age gaps. Recent research has also uncovered considerable heterogeneity by (ancestral) country of birth in the family formation of immigrants and their descendants (Adserà and Ferrer 2015). We therefore seek to examine the extent of adaptation to the Swedish age gap norm among immigrants compared with their descendants. To achieve this, we pose the following research questions:

(1) How do immigrant age gaps vary by birth cohort and country of birth, and how do they compare with the mean age gap in Sweden?
(2) Is there evidence of adaptation across generations if we: (a) compare the age gaps of consecutive generations by (parental) country of birth; and (b) compare immigrants with their children by (parental) country of birth?
(3) Does evidence of adaptation differ for women and men, and what can we conclude by examining the intersection between sex and migration background?

Together, these questions enable us to establish differences between immigrants, their descendants, and the mainstream Swedish norm. We do not seek to estimate age gaps in countries of origin, not least because there is a lack of nationally representative data of sufficient detail and quality. However, we do not believe that this is necessary for answering our research questions, primarily because our evaluation of adaptation takes age gaps of first-generation immigrants as the starting point, that is, the 'initial' difference that may converge towards the Swedish norm (Wilson and Sigle-Rushton 2014). We include immigrants from all countries, to understand heterogeneity and because (due to the possibility of selection) we do not know a priori which groups of immigrants will report higher/lower age gaps.

In the following analysis, we examine the age gaps of the entire population of Sweden born between 1950 and 1986. We focus on Sweden as one of the few countries with both a long history of sustained levels of immigration and data to analyse the age gaps of immigrants and their descendants for the whole population, by sex, birth cohort, and (parental) country of birth. Thanks to links between all parents and children in Swedish data, we can compare first-generation parents and their own second-generation children. A further advantage of Sweden as a case study is its high gender equality and a stable mean period age gap. Since the late 1960s, Swedish-born men in opposite-sex unions have been on average around two years older than their female partners (Kolk 2015).

Background

Over the course of the twentieth century, partner age differences decreased: in many high-income countries, men in opposite-sex unions became closer in age on average to their female partners (Ní Bhrolcháin 1992; van Poppel et al. 2001; Esteve et al. 2009; Kolk 2015). Before industrialization, large age gaps between spouses or partners were common in high-income countries, as resource acquisition was often highly desirable for men before entering marriage, although not for women (Hajnal 1983). Given that men's resources tend to increase with age, whereas traits valued in females (such as childbearing potential) decrease with age, 'man-older' unions were prevalent and age gaps often considerable. As the Malthusian features of marriage—where resources constrain reproduction — became less pertinent, the landscape of union formation changed. In the twentieth century, when unions became less driven by instrumental reasons, relationships were more often entered into on the

basis of emotion (Shorter 1975). As an example of this change, age heterogamy in the Netherlands decreased linearly from an average of 4.5 years (man older) in 1850 to 2.6 years in the 1970s (van Poppel et al. 2001). Importantly, this cannot be explained solely by lower ages at marriage during the same period (van Poppel et al. 2001).

Because age gaps are, in part, determined by opportunities to find partners of a given age, temporary shifts in age gaps may also be caused by population dynamics. Changes in sex ratios (and thus partnership 'squeezes') may occur due to fluctuating cohort sizes, sex biases in migration, or wars, and these may cause changes in age gaps because one sex is more plentiful than the other (Ní Bhrolcháin 2001). However, a fluctuation in sex ratios is unlikely to explain long-term trends in age gaps because its impact will disappear over time. A more likely explanation, just like for trends in other aspects of partnership behaviour, is changes in preferences, norms, and opportunities (Kalmijn 1998).

In high-income countries, with increased enrolment in higher education (especially among women), there have been changes both in individual life courses (e.g. delayed entry into parenthood) and in the environments in which partners meet and form unions (Chudnovskaya 2017). Related to this is the decline in marriage, rise in cohabitation, and increase in union dissolution (Lesthaeghe 2010). All these trends may have driven changes in age gaps between partners and suggest that there are good reasons to focus on childbearing unions (as we do here).

In addition, it is likely that changing age gaps reflect changes in gender dynamics. Using historical data, increasing age homogamy has been explained by a weaker link between resources and marriage (Dribe and Stanfors 2017) and also by a shift in cultural norms (Van De Putte et al. 2009), both of which relate to gender roles. Taking a cross-cultural perspective, patriarchal societies tend to exhibit larger age differences and more man-older relationships (Casterline et al. 1986). There is also evidence of a correlation between international measures of gender equality and lower age gaps (Carmichael 2011). Moreover, the degree of parental involvement in partner choice varies cross-culturally (Buunk et al. 2010) and has been found to be larger among some immigrant groups with more traditional family norms compared with the native born (Van Zantvliet et al. 2014). If parents' ability to influence their children's partner choice lessens in the destination country, this might contribute to a dissipation of traditional partnership norms. Thus, while it is clear that many factors contribute to age gaps in individual unions, it could be argued that macro-level measures of average age gaps are an indirect measure of preferences and norms related to gender equality. We recognize that age is not the only characteristic that might be 'traded' in the process of family formation. However, we interpret average age gaps as an aggregate marker of egalitarianism (e.g. Van De Putte et al. 2009), in particular for immigrants and their descendants who are living in an egalitarian country such as Sweden.

Family behaviour and adaptation among immigrants and their descendants

The family behaviours of immigrants often differ in important ways from those of the native-born population (Kulu and González-Ferrer 2014). As immigrants settle and integrate to life in their new destination, they may adapt their family behaviour over time to resemble more closely the average behaviour of the destination population—the mainstream norm (Alba and Nee 2005). Research has demonstrated that family behaviours are more likely to resemble those of the mainstream population if immigrants have experienced greater exposure to destination norms (i.e. through duration of residence). Studies have focused on partnership and partner choice (Dribe and Lundh 2008), entry into parenthood (Andersson 2004), and completed fertility (Wilson and Kuha 2018) but not on partner age gaps.

Migration scholars have used a range of theories to explain differences in family behaviours between native- and foreign-born populations (Milewski 2010; Kulu and González-Ferrer 2014). Differences may result from exposure to norms and preferences during childhood (socialization), underlying demographic or socio-economic characteristics (compositional differences), artefacts of the migration event (e.g. delays in childbearing until after migration), or exposure to living in a new destination (adaptation). Research designs that can reliably distinguish between these explanations are elusive (Wilson and Sigle-Rushton 2014; Tønnessen and Wilson 2020), largely because immigrants are selectively different from non-immigrants (e.g. Ichou 2014; Feliciano 2016; Wallace and Wilson 2019), including with respect to their family formation (Mussino and Ortensi 2018). As one way to avoid this dilemma, researchers have proposed that adaptation is better tested by examining the behaviour of the descendants of immigrants, especially

compared with that of their parents' generation (Smith 2003; Parrado and Morgan 2008).

Here we follow this line of argument in order to carry out a more rigorous test of adaptation than would be possible by focusing on the age gaps of immigrants alone. Instead of trying to analyse adaptation across the lives of individual immigrants, we examine how mean age gaps change over time and across generations. In particular, we compare first-generation immigrants with their descendants, the second generation, including by making a direct comparison between individual immigrants and their children. Other authors have referred to this approach as a test of intergenerational assimilation (e.g. Parrado and Morgan 2008) or intergenerational adaptation (Dubuc 2012). However, at least in theory, convergence of mean age gaps may be determined by factors other than assimilation or adaptation. Convergence may occur due to structural factors (i.e. institutional factors or labour market participation (Andersson and Scott 2005)) or as a by-product of other changes in family behaviours. The role of norms in relation to family behaviour is a contested topic (Liefbroer and Billari 2010), something we return to in the 'Discussion' section.

The intersection between gender and migration background

Gender plays a fundamental role in shaping the lives of immigrants and their descendants (Pedraza 1991; González-Ferrer et al. 2018). Here, we argue for taking an intersectional approach when analysing demographic behaviours (Sigle 2016), particularly because partnership age is likely to differ between women and men (Ní Bhrolcháin 1992). Our study examines the interaction between sex and migration background to understand how immigrant age gaps differ for females and males and whether descendants of immigrants show different degrees of adaptation by sex. Among any group where there are preferences or norms regarding man-older unions, women and men may face different scenarios at the time of family formation. For women, opportunities to find a partner decrease with age, whereas young men may delay family formation and spend a longer time being single. Provided that the man has had longer to establish himself in the labour market, both partners in a man-older union may face incentives to adhere to a traditional male-breadwinner relationship, even though they did not enter the relationship on those grounds (Rothstein 2012). Incentives for a traditional family norm among man-older couples apply to both immigrants and natives, but women with a migration background may be particularly vulnerable to economic factors (Qian 2013), given their weaker attachment to the labour market (Bevelander 2005).

In a population where partnership is only endogamous (between members of the same group) and monogamous (no concurrent partners), age gaps for males and females should logically be the same. However, when comparing average age gaps in different subgroups of the population—as we do here by birth cohort, generation, and country of birth—results are not necessarily symmetrical for women and men (Ní Bhrolcháin 1992). This may be due to differences in intermarriage rates, for example, or because men are more likely to enter multiple childbearing unions (Ní Bhrolcháin 1992; de Graaf and Kalmijn 2003; Ivanova et al. 2013). In this paper, we focus on the partner age gap at the time of the first childbearing union. Using childbearing unions gives a more stable and generalizable measure of average age gaps (Thomson et al. 2012), especially for younger birth cohorts, because the significant numbers of unmarried couples are not excluded. Cohabitation before marriage is the norm in Sweden, and any analysis of marriages alone would exclude approximately half of all first childbearing unions (Thomson and Bernhardt 2010). But because childbearing outside marriage is less common for some immigrant groups than for native-born Swedes (Dribe and Lundh 2012), we include some analysis of marital age gaps in our supplementary material (Table A3). By focusing on *first* childbearing unions, we not only use the most relevant demographic measure for the Swedish context but enable a more comprehensive comparison across generations.

Partnerships between immigrants and the native born

Age gaps among immigrants are partly a product of the degree to which they partner with the native-born population (often called intermarriage). We refer to unions between immigrants and the native born as binational partnerships (to include both marriage and cohabitation). A number of studies have examined the determinates of binational partnerships, finding that they are more common for immigrants who have spent longer residing in the destination country (Dribe and Lundh 2008; Obućina 2016; Qian and Lichter 2018). The prevalence of binational unions is sometimes regarded as

a definitive marker of immigrant integration (Kalmijn 1998; Qian and Lichter 2007). Irrespective of their meaning, binational unions are known to exhibit different age gaps. For example, large age gaps are more common for native-born Swedes if they partner with an immigrant (Gustafson and Fransson 2015), particularly where the male or female partner is from Asia, Africa, Latin America, or the Middle East (Elwert 2018). According to the theory of status exchange, partnership formation involves a process of 'trade' (between partners) in terms of their traits. Age may be traded for ethnicity when older, native-born men partner with younger women of minority ethnicities (Balistreri et al. 2017; Elwert 2018). Age, migration background, and partner's migration background are all part of a broader set of characteristics that might be traded—many of which are unmeasured in almost all data sets, including this one. Nevertheless, we carry out some analyses separately for binational unions to examine the role of migration background; this may provide some insights about the role of status exchange in Sweden.

The partnership behaviour of immigrants and their descendants in Sweden

Given the amount of heterogeneity by migration background, it is hard to generalize about the partner market(s) for immigrants and their descendants in Sweden. Until recently, Finland was the most common foreign country of birth in Sweden, and Nordic and Western European immigrants continue to make up a large part of its foreign-born population. Although such immigrants (and their partners) share many aspects of cultural background with Sweden, differences in family behaviours may exist due to their being selectively different from their origin populations. For this reason, we prefer to study all origin groups. Immigration to Sweden has changed in character since the 1970s, partly due to an increase in refugee arrivals (Statistics Sweden 2004), such that immigrants now come from across the globe (see Table 1). Immigrants in Sweden vary greatly with respect to their likelihood of marrying a native-born partner, their age at union formation, and their risks of dissolution or remarriage (Dribe and Lundh 2008; Andersson et al. 2015). Yet, much research has considered broad origin groups, and we still know relatively little about partnerships between those from different individual countries of origin, in particular when comparing immigrants and their children. In our data the first childbearing union for 31 per cent of Asian women born 1950–59 was with a Swedish-born man, whereas the equivalent figure for women from the Middle East was only 2 per cent (see supplementary material, Table A6). Among Asian men born 1950–59, 16 per cent experienced their first childbearing union with a Swedish-born woman, whereas the equivalent figure for men from the Middle East was 7 per cent. Sex differences vary considerably for different origin groups: in this example, women from Asia are more likely to be in a binational union than their male counterparts, whereas the opposite is true for women from the Middle East. While these percentages merely depict the outcome—not preferences or underlying processes—they clearly show that there are different partnership trajectories according to the origin and sex of immigrants.

Sweden is considered a relatively open society, with a low degree of educational homogamy compared with the rest of Europe (Domanski and Przybysz 2007). On examining intermarriage from the perspective of native-born Swedes, Elwert (2016) found that age was a more pertinent trait for status exchange than the immigrant partner's educational level. We note that 'marriage migration'—immigration linked to union formation—has increased in Sweden since the 1990s, but is still low overall, although this varies by country of origin (Niedomysl et al. 2010). Previous research has shown that male descendants of immigrants are more likely than their female counterparts to marry or be in a childbearing relationship with a Swedish-born person (Haandrikman 2014; Çelikaksoy 2016). Immigrant men with higher education are more likely than women in Sweden to partner with someone outside their own origin group (Behtoui 2010; Çelikaksoy 2016), implying that preferences, norms, or opportunities may differ between highly educated male and female immigrants. Among male descendants of immigrants, the proportion of unions that are binational has doubled from 12 per cent since the early 1990s, but there has been no corresponding increase for females (Haandrikman 2014). As Table A6 (supplementary material) shows, there are large cohort differences in binational union rates by region of origin. For example, for 24–27 per cent of immigrant women from Europe, their first childbearing union was with a Swedish-born man, regardless of being born in the 1950s or 1980s, whereas the figure for immigrant women from Latin America more than doubled, from 19 per cent for those born 1950–59 to 43 per cent for those born 1980–86.

Sweden is uniquely suited for a study of age gaps among immigrants and their descendants for at

Table 1 Population frequencies in Sweden by country of birth/ancestry, generation, and birth cohort

		Men		Women	
		Generation and birth cohort			
Country of birth (G1) /ancestry (G2)	Country (group) code	G1 1950–69	G2 1970–86	G1 1950–69	G2 1970–86
Europe and North America					
Finland	FI	17,847	12,414	26,217	13,975
Denmark	DK	5,916	799	5,333	853
Iceland	IS	1,927	101	1,787	109
Norway	NO	6,837	454	8,046	517
Bosnia Herzegovina	BA	10,261	90	9,258	107
Former Yugoslavia (excl. Bosnia H.)[1]	YU	14,497	4,488	13,265	4,455
Poland	PL	5,749	1,160	12,057	1,268
UK and Ireland	UK	6,698	140	3,154	154
Germany, Austria, Switzerland, Liechtenstein	GE	4,849	536	4,537	557
Netherlands	NL	1,823	62	1,263	46
South Europe 1[1]	SE1	1,939	253	1,231	270
Greece and Cyprus	GR	3,232	1,101	1,770	986
Italy and Malta	IT	1,479	123	581	99
Latvia and Lithuania	LV	435	13	655	16
East Europe 1[1]	EE1	2,155	102	5,276	89
East Europe 2[1]	EE2	982	–	1,099	–
Estonia	EE	253	70	472	74
Bulgaria	BU	770	46	894	44
Romania	RO	2,345	52	2,889	43
Czech Republic and Slovakia	CZ	605	335	1,010	325
Hungary	HU	1,386	488	1,996	465
France, Belgium, Luxembourg, Monaco	FR	1,908	54	1,436	41
USA and Canada	US	4,727	34	3,659	47
South America					
Central America and Caribbean	CAm	1,842	35	1,803	37
Chile	CL	5,564	549	5,270	623
Brazil	BR	418	21	1,251	25
Other South America	SAm	3,687	292	3,943	317
Africa					
Egypt	EG	1,137	72	478	67
Eritrea	ER	2,090	32	1,328	43
Ethiopia	ET	2,829	32	1,988	46

(*Continued*)

Table 1 Continued.

Country of birth (G1) /ancestry (G2)	Country (group) code	Men		Women	
		Generation and birth cohort			
		G1 1950–69	G2 1970–86	G1 1950–69	G2 1970–86
Somalia and Djibouti	SO	3,974	–	2,629	-
North Africa (excl. Egypt)[1]	NAf	4,601	296	2,386	352
Other Africa	AFR	5,276	131	3,456	127
Middle East					
Lebanon	LB	5,803	290	3,625	339
Syria	SY	10,594	418	5,974	469
Iran	IR	15,912	169	12,110	203
Iraq	IQ	18,983	122	12,280	137
Turkey	TR	7,062	2,867	5,503	3,059
Other Middle East	ME	1,380	152	853	169
Asia					
China (excl. Taiwan and Hong Kong)	CN	2,203	54	2,931	65
Korea[1]	KO	343	20	517	31
Other East Asia	EA	1,116	46	1,816	31
Philippines	PH	268	30	2,566	46
Vietnam	VN	2,239	126	2,241	170
Thailand	TH	383	47	5,451	27
Afghanistan	AF	2,001	–	1,322	–
Pakistan and Bangladesh	PK	2,417	188	1,457	172
India, Nepal, Bhutan, Maldives	IN	1,531	133	1,243	153
Sri Lanka	LK	662	24	887	26
New Zealand and Australia	NZ	1,177	–	657	–
Other South-East Asia and Pacific	PA	774	36	932	29
Total		204,886	29,097	194,782	31,303

[1]Country group detail: YU (Former Yugoslavia, excluding Bosnia Herzegovina) = Yugoslavia, Croatia, Macedonia, Montenegro, Serbia, Slovenia; SE1 (South Europe 1) = Andorra, Gibraltar, Portugal, Spain; EE1 (East Europe 1) = Moldova, Russia, USSR, Ukraine, Belarus; EE2 (East Europe 2) = Armenia, Azerbaijan, Georgia, Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan; NA (North Africa, excluding Egypt) = Algeria, Morocco, Libya, Tunisia; KO (Korea) = North Korea, South Korea. Categorizations are those used by Statistics Sweden.
Notes: G1 = first generation, G2 = second generation. Groups of fewer than 10 individuals are not shown.
Source: Authors' calculations based on Swedish register data.

least four reasons. First, high levels of gender equality are a pervasive feature of Swedish society. Sweden is often considered a forerunner in family change with high levels of women's labour force participation and paternity leave (Bernhardt et al. 2007). This means that the age gap norm for the Swedish-born population is less likely to be determined by sex disparities, and that male and female immigrants have the same opportunities, at least with respect to Swedish institutions and broader society. Second, Sweden's mean period age gap is stable. Since the late 1960s, Swedish men have been around two years older, on average, than their female partners (Kolk 2015). This demonstrates that the Swedish norm is relatively unambiguous and that any adaptation towards this norm is unaffected by changes in the norm itself. Third, Sweden's population of immigrants—and descendants of immigrants—is large and diverse due to a long history of sustained immigration. Since the latter half of the twentieth century, the foreign-born population in Sweden has grown considerably. Currently, about one-quarter of the Swedish population is either foreign born or has at least one foreign-born parent (Statistics Sweden: www.scb.se/en/), which makes our study feasible and indicates its relevance for understanding population change and family dynamics for a large section of the population. The fourth advantage of the Swedish case is that it allows us to make use of longitudinal register data for the whole population, including all immigrants and their descendants.

Taken together, these four characteristics are not found in any other national context, at least not for a country with more than 10 million residents. These factors allow us to study immigrants from many different countries of birth (who were born during different decades and migrated for different reasons) alongside their descendants who were born and raised in Sweden. Based on our conceptualization of adaptation, we expect to see a convergence of partner age gaps (towards the Swedish average) across both time and generations. However, based on what we know about sex differences in age gaps, particularly in relation to opportunities and constraints, we expect to observe larger age gaps and less evidence of convergence for women. Moreover, we expect this to be particularly the case for those whose migration background is linked with origins that are more likely to benefit from enhanced opportunities (e.g. for binational partnerships) or face constraints (e.g. traditional gender roles). Nevertheless, the process of age gap adaptation may be universal for the second generation, irrespective of sex and migration background. The second generation in Sweden often exhibits similar levels of entry into parenthood (Scott and Stanfors 2011) and similar (or lower) fertility (Andersson et al. 2017), marriage rates (Andersson et al. 2015; Wiik and Holland 2018), and divorce rates (Andersson et al. 2015) to native-born children of Swedish-born parents. Our study builds on existing work and represents the first exploration of parental age gaps among immigrants and their descendants in Sweden or any other national context.

Data and methods

We use register-based data collected and administered by Statistics Sweden, accessed on a secure server, and made available after ethical approval (as part of the 'Migrant Trajectories' project). The subset of data used for our analysis is based on a collection of linked registers covering vital events—births, deaths, immigrations, and emigrations—in Sweden, 1950–2016. Inclusion from 1950 is contingent on having lived in Sweden in 1960 (full coverage of vital events is available from 1968). These data allow us to analyse age gaps for childbearing unions at the time of first parenthood. Our study captures unions for male and female immigrants who were subsequently resident in Sweden, regardless of whether the child was born in Sweden. This means that unions may have been formed abroad, potentially preceding the decision to emigrate (although we have no data on when). Our study population is the entire Swedish-born population born between 1950 and 1986 (with the additional restriction of residence in Sweden at some point between 1950 and 2016) and individuals born between 1950 and 1986 who arrived in Sweden during this time. The start year was chosen because the majority of immigrants born before 1950 came from other Nordic countries. There are also very few descendants of immigrants who were themselves born before 1950. The end year was chosen because we focus on childbearing unions at the time of first parenthood (i.e. individuals need to have had a first birth in order to be included in our study). We therefore chose to include only individuals aged 30+, meaning we exclude individuals born after 1986 (aged <30 in 2016, the final year in our data).

The register data allow us to examine more than 50 countries of birth (or country groups) separately and to distinguish between immigrants who arrive as adults (the first generation, G1) and the children

of two foreign-born parents (the second generation, G2). In our main analyses of G1, we include only adult arrivals (those arriving aged 18+). This is because including child migrants (arriving aged 0–17, known as G1.5) would confound the influence of origin country norms with socialization in Sweden (exposure to Swedish society and norms during childhood). For comparison, we include analysis of G1.5 in Figure A2, supplementary material ($n = 105{,}180$). We also exclude the so-called G2.5—Swedish-born individuals with one Swedish- and one foreign-born parent ($n = 345{,}460$)—to reduce uncertainty about the environment and norms this group has been exposed to, as well as any immigrant observed with at least one Swedish-born parent ($n = 22{,}560$). We also exclude 7,868 individuals whose own or parental country of birth is missing and a further 331 cases with missing data on partner's country of birth. All G1 immigrants are categorized by their own country of birth. The ancestry of G2 is based on mother's country of birth. In the analysis on age gaps among G1, we distinguish between unions where partners share the same country of birth and those where one partner is Swedish born. A complete list of countries of birth (G1) and ancestry (G2) is shown in Table 1.

Our outcome variable is the age gap between individuals and their partners when entering a childbearing union for the first time. As noted earlier, partners may or may not have had children before. In all cases, age gaps are calculated by subtracting the man's age from the woman's age in years (irrespective of whether we are estimating averages for women or men). We limit our analysis to opposite-sex unions. It is possible for an immigrant's union to have been formed before coming to Sweden, but we have no information on when. Similarly, we are unable to identify cohabitations without childbearing for any Swedish residents, because Swedish register data did not allow cohabitants to be identified until at least 2011. That said, with the exception of some robustness checks (described later), we include all unions at the time of a parent's first birth, regardless of whether the birth was within marriage or cohabitation, or the parents never co-resided. Some subgroups of the population are small, so we drop any estimate based on a subpopulation of fewer than ten individuals. Our final study population includes 349,317 male and 340,928 female G1 immigrants from 51 countries (or country groups) of birth, plus 50,376 male and 53,042 female Swedish-born members of G2. Some analyses are restricted to specific birth cohorts. In some supplementary analyses we focus on immigrants who arrived at ages 0–17 (G1.5: 52,634 males and 52,546 females). The reference population of 'ancestral Swedes' (the Swedish born with two Swedish-born parents) comprises 1,210,440 men and 1,275,461 women.

Given that our research questions concern changes in age gaps at the aggregate level, our method focuses on the estimation of mean age gaps (although for comparison we also provide a summary of median age gaps in Table A7, supplementary material). Estimating these means is straightforward, given the availability of whole-population data. To answer the first research question, we plot trends in mean age gaps by birth cohort for Ancestral Swedes and five other country-of-birth regional groups: Europe and North America, Latin America, Africa, Middle East, and Asia. This allows us to contrast the trends for G1 immigrants with those for the Swedish-born population. We construct five-year moving averages because some combinations of year of birth and country of birth yield small numbers, which also explains why we group country of birth into regions for this purpose, rather than using individual countries as in the rest of the analysis.

To answer our second research question regarding adaptation, we first compare age gaps for G1 and G2, across lagged generations. We then consider the role of binational unions by disaggregating age gaps for G1 by sex according to partner's country of birth. Finally, we carry out an individual-level comparison of age gaps for G2 women and men with the age gaps of their parents, which is analogous to making a within-family comparison (i.e. not dissimilar to using family fixed effects). We focus on G2 for this because data that link parents and children are available only if the focal individual's parents have ever lived in Sweden (which is rare for adult arrivals, but means that we can repeat the analysis for G1.5; see Figure A2, supplementary material).

To answer our third research question, we stratify all our analyses by sex. This enables us to examine the complex intersection between sex and migration background.

Results

For ancestral Swedes who have completed childbearing, age gaps at first childbearing union are slightly lower for more recent cohorts. Figure 1 shows this

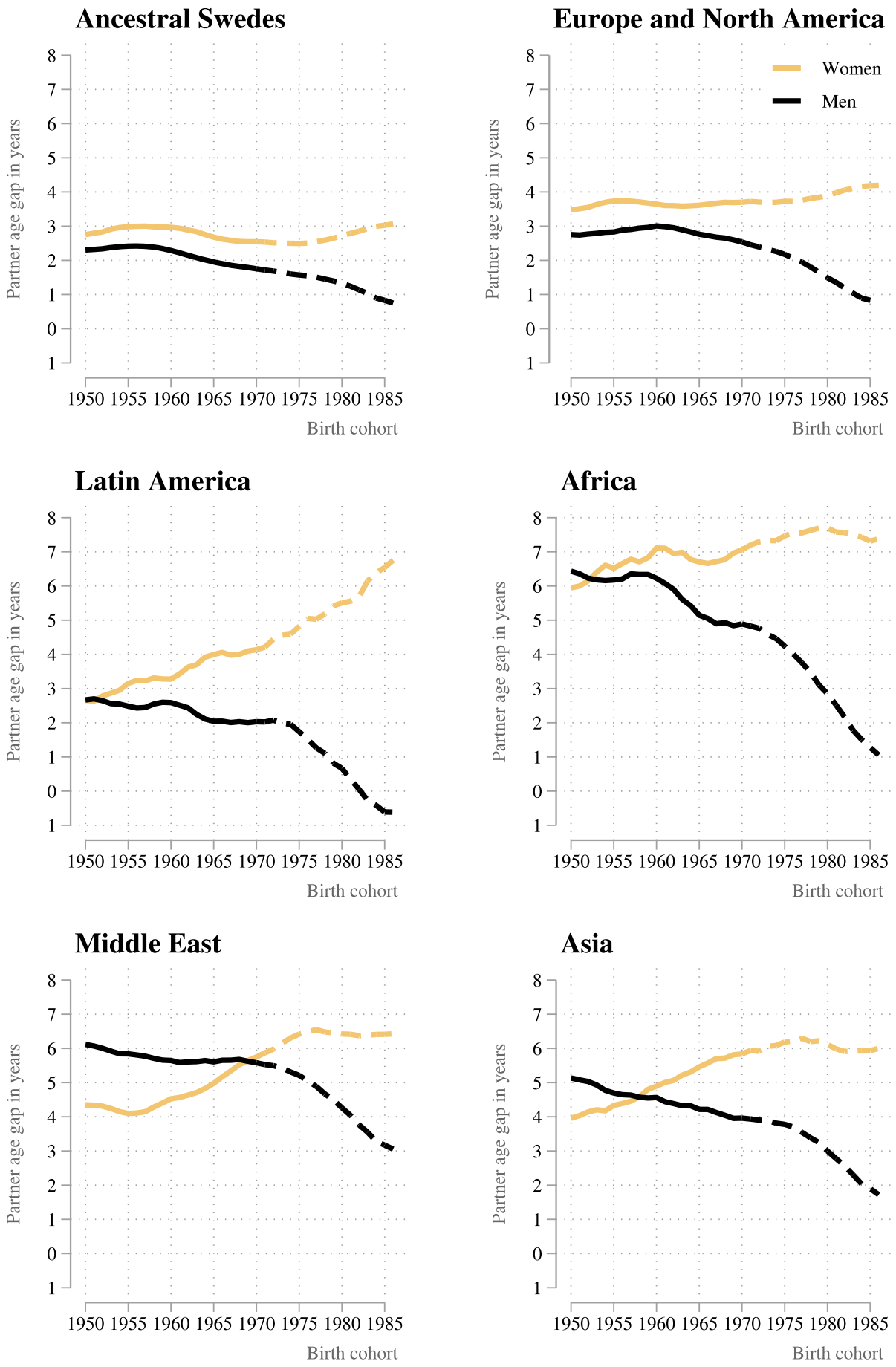

Figure 1 Mean age gap between partners with children in Sweden, by region of birth and birth cohort
Notes: Mean partner age gap refers to the man's age minus the woman's age, in years. These figures show five-year moving averages. Dashed lines indicate cohorts born from 1971 onwards, thus aged 30–45 in the final year of our data (2016) and yet to complete childbearing. Results for Ancestral Swedes (top left panel) exclude the second generation.
Source: Authors' calculations based on Swedish register data.

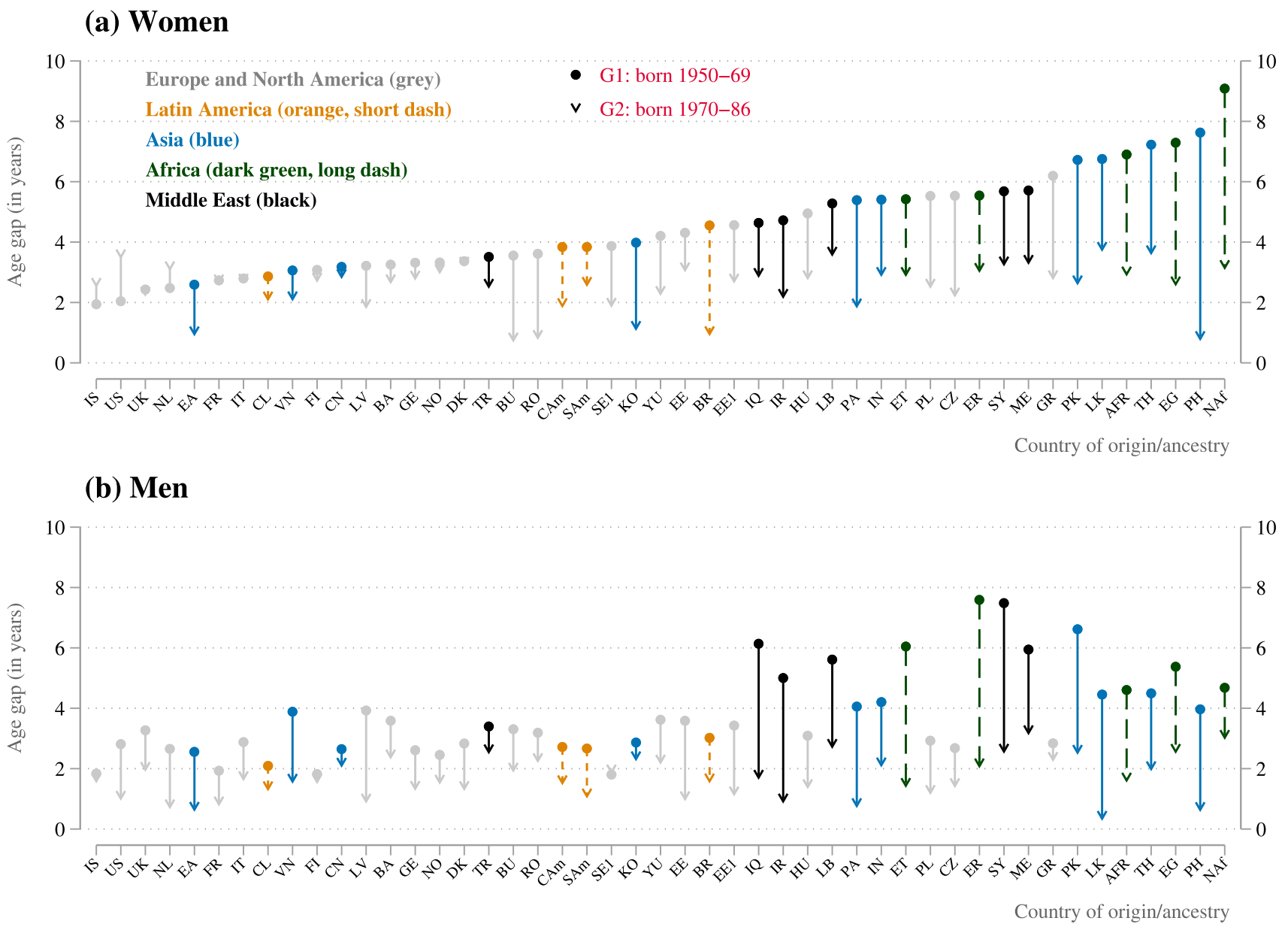

Figure 2 Partner age gap: G1 vs G2 lagged across cohorts, by country of birth (G1) or ancestry (G2) for (a) women; and (b) men

Note: Mean partner age gap refers to the man's age minus the woman's age, in years. See Table A1, supplementary material, for the numbers on which this figure is based. See Table 1 for country group codes used here. Groups of fewer than 10 individuals are not shown. Readers of the printed version may wish to view the online paper to see the colours more clearly. *Source*: As for Figure 1.

trend alongside the equivalent trends for G1 immigrants, grouped into five different regions based on country of birth.

The trend lines are dashed after 1971 to indicate that women and men born after 1971 have not yet completed childbearing (i.e. not reached age 45 years in 2016). We observe age gaps only for those with a first birth: around 85–90 per cent of the population for cohorts born before 1971, but a lower proportion for those born afterwards. Among ancestral Swedish cohorts who have not completed childbearing (born 1971–86), age gaps diverge for younger cohorts. Mothers from younger cohorts tend to exhibit larger age gaps (i.e. relatively older male partners), whereas fathers from younger cohorts tend to report smaller age gaps (i.e. relatively older female partners). As suggested by the dashed lines—irrespective of region of origin—this phenomenon becomes less evident as childbearing becomes closer to being complete. Age gaps are associated with age at first birth in opposite ways for men and women, and this association is similar for ancestral Swedes and immigrants from all birth regions (Figure A1, supplementary material). In essence, mean age gaps (as an aggregate marker of adaptation) may be underestimated for men and overestimated for women until childbearing is complete. By the time everyone in a cohort has completed childbearing, those who have postponed childbearing will have had a first birth (a requirement to be included in our analysis) and their age gap will therefore be less constrained by their age.

In general, mean age gaps for male immigrants exhibit a similar trend to Swedish-born men with Swedish-born parents. That said, age gaps are systematically higher by around one year for Europeans and North Americans, around four years for men from the Middle East, and around three years for men from Asia. The male immigrants who differ most from ancestral Swedes are those born in Africa, whose mean age gap falls from 6.5 years for those born in 1950 to 5.0 years for those born in 1970. This is likely due, at least partly, to changes in the selection of migrants from Africa.

Figure 1 also shows the importance of taking an intersectional approach. Unlike G1 men, G1 women who have completed childbearing exhibit age gaps that are increasingly larger than the ancestral Swedes' average for more recent cohorts. For example, the mean age gap for Asian women rises from four years to six years, when comparing those born in 1950 and 1970.

Figure 2 compares the age gaps for G1 born 1950–69 and G2 born 1970–86 from the same country of birth (G1) or ancestry (G2). Lagged comparisons have been argued to be a more accurate assessment of adaptation than comparisons between younger and older cohorts or G1 and G2 overall, because they more closely approximate comparisons between parents and their children (Smith 2003; Parrado and Morgan 2008). Figure 2(a) displays results for women and shows that for almost all origins, the mean age gap is lower for G2 than G1 (from the same origin). The largest reductions are found for African, Asian, and Middle Eastern origins: those with large age gaps for G1 (typically more than four years).

For men (Figure 2(b)), the main finding is the same: age gaps are smaller among G2 than G1. The fact that mean age gaps are lower for both G2 women and G2 men is evidence in support of intergenerational adaptation, especially for those G1 groups who exhibit a material difference from the Swedish norm of around two years. We note that half of all G1 groups show a mean age gap of more than four years for females, whereas the equivalent proportion for males is around one-third, and for these origins with relatively high age gaps the average decline across generations is around three years for both women and men.

Our conclusions based on Figure 2 are supported by regression analysis (Table 2). This analysis shows that compared with G1, the mean age gap for G2 is closer to the average for ancestral Swedes for the vast majority of origin country groups (83 per cent for men and 74 per cent for women). Without placing too much importance on statistical significance (because we use data for the whole population), we note a significant decline for all groups of women and men with an initial difference of more than two years between the mean age gap of G1 and ancestral Swedes (excluding groups with fewer than ten members of G2). This remains the case after controlling for birth cohort, age at first birth, and binational union status (whether the individual's partner is Swedish born, from the same country of birth group, or from a different country of birth group) (see Table A2, supplementary material).

A primary reason for differences in age gaps between males and females—in particular for immigrants from the same country of birth—is sex differences in patterns of union formation with the Swedish-born population. As expected, there is a strong positive correlation between the mean age

Table 2 Modelling results from regressions comparing the partner age gap among G1 and G2 with ancestral Swedes, by sex and country of origin

	Men				Women			
Country of birth (G1) / ancestry (G2)	G1 1950–69	G2 1970–86	Difference (G2 minus G1)	G2 closer to Ancestral Swedes than G1?	G1 1950–69	G2 1970–86	Difference (G2 minus G1)	G2 closer to Ancestral Swedes than G1?
Europe and North America								
Finland	−0.35	0.22	0.57*	yes	0.26	0.14	−0.13*	yes
Denmark	0.65	−0.01	−0.66*	yes	0.56	0.69	0.12	no
Iceland	−0.32	0.20	0.52	yes	−0.85	−0.02	0.83	yes
Norway	0.27	0.22	−0.05	yes	0.50	0.41	−0.09	yes
Bosnia Herzegovina	1.40	1.03	−0.38	yes	0.44	0.15	−0.29	yes
Former Yugoslavia (excl. Bosnia H.)[1]	1.44	0.88	−0.56*	yes	1.38	−0.28	−1.66*	yes
Poland	0.75	−0.09	−0.84*	yes	2.70	−0.03	−2.73*	yes
UK and Ireland	1.08	0.61	−0.47	yes	−0.40	−0.28	0.12	yes
Germany, Austria, Switzerland, Liechtenstein	0.43	0.08	−0.35	yes	0.52	0.21	−0.30	yes
Netherlands	0.46	−0.62	−1.08*	no	−0.32	0.53	0.85	no
South Europe 1[1]	−0.39	0.54	0.93*	no	1.09	−0.67	−1.76*	yes
Greece and Cyprus	0.65	0.96	0.31*	no	3.35	0.21	−3.14*	yes
Italy and Malta	0.69	0.32	−0.37	yes	0.03	0.12	0.09	no
Latvia and Lithuania	1.75	−0.43	−2.18	yes	0.38	−0.72	−1.10	no
East Europe 1[1]	1.23	−0.21	−1.44*	yes	1.72	0.14	−1.57*	yes
East Europe 2[1]	2.51	–	–	–	0.68	–	–	–
Estonia	1.38	−0.35	−1.73*	yes	1.57	0.49	−1.07	yes
Bulgaria	1.10	0.60	−0.50	yes	0.73	−1.83	−2.57*	no
Romania	0.98	0.92	−0.06	yes	0.78	−1.75	−2.52*	no
Czech Republic and Slovakia	0.48	0.11	−0.37	yes	2.74	−0.34	−3.08*	yes
Hungary	0.93	0.04	−0.89*	yes	2.10	0.22	−1.88*	yes
France, Belgium, Luxembourg, Monaco	−0.28	−0.52	−0.24	no	−0.12	0.14	0.26	no
USA and Canada	0.62	−0.30	−0.92	yes	−0.75	0.92	1.67*	no
South America								
Central America and Caribbean	0.55	0.18	−0.37	yes	1.02	−0.69	−1.71*	yes
Chile	−0.09	−0.04	0.05	yes	0.02	−0.47	−0.49*	no
Brazil	0.79	0.22	−0.57	yes	1.69	−1.33	−3.02*	yes
Other South America	0.49	−0.22	−0.71*	yes	1.01	0.03	−0.98*	yes
Africa								
Egypt	3.15	1.24	−1.90*	yes	4.41	−0.17	−4.58*	yes
Eritrea	5.42	0.74	−4.68*	yes	2.70	0.60	−2.10*	yes
Ethiopia	3.87	0.09	−3.78*	yes	2.60	0.34	−2.26*	yes

(*Continued*)

Table 2 Continued.

Country of birth (G1) / ancestry (G2)	Men				Women			
	G1 1950–69	G2 1970–86	Difference (G2 minus G1)	G2 closer to Ancestral Swedes than G1?	G1 1950–69	G2 1970–86	Difference (G2 minus G1)	G2 closer to Ancestral Swedes than G1?
Somalia and Djibouti	4.73	–	–	–	3.11	–	–	–
North Africa (excl. Egypt)[1]	2.49	1.68	−0.81*	yes	6.28	0.54	−5.73*	yes
Other Africa	2.44	0.24	−2.20*	yes	4.11	0.38	−3.73*	yes
Middle East								
Lebanon	3.43	1.36	−2.07*	yes	2.47	1.01	−1.46*	yes
Syria	5.30	1.25	−4.06*	yes	2.89	0.70	−2.20*	yes
Iran	2.82	−0.43	−3.25*	yes	1.91	−0.38	−2.29*	yes
Iraq	3.96	0.36	−3.61*	yes	1.81	0.30	−1.51*	yes
Turkey	1.22	1.22	0.00	no	0.70	−0.06	−0.76*	yes
Other Middle East	3.75	1.83	−1.92*	yes	2.84	0.73	−2.11*	yes
Asia								
China (excl. Taiwan and Hong Kong)	0.45	0.76	0.31	no	0.37	0.27	−0.10	yes
Korea	0.66	0.97	0.32	no	1.20	−1.45	−2.64*	no
Other East Asia	0.38	−0.71	−1.09	no	−0.22	−1.63	−1.41	no
Philippines	1.81	−0.71	−2.52*	yes	4.80	−1.78	−6.58*	yes
Vietnam	1.71	0.23	−1.48*	yes	0.22	−0.43	−0.65	no
Thailand	2.33	0.64	−1.68*	yes	4.40	1.06	−3.34*	yes
Afghanistan	4.96	–	–	–	3.11	–	–	–
Pakistan and Bangladesh	4.44	1.19	−3.25*	yes	3.87	0.04	−3.83*	yes
India, Nepal, Bhutan, Maldives	2.03	0.75	−1.27*	yes	2.52	0.28	−2.24*	yes
Sri Lanka	2.28	−1.00	−3.28*	yes	3.93	1.08	−2.85*	yes
New Zealand and Australia	0.46	–	–	–	−0.71	–	–	–
Other South-East Asia and Pacific	1.87	−0.58	−2.45*	yes	2.54	−0.70	−3.25*	yes
Percentage non-missing where G2 closer to Ancestral Swedes:				*83*				*74*

[1]Country group detail: Former Yugoslavia, excluding Bosnia Herzegovina = Yugoslavia, Croatia, Macedonia, Montenegro, Serbia, Slovenia; South Europe 1 = Andorra, Gibraltar, Portugal, Spain; East Europe 1 = Moldova, Russia, USSR, Ukraine, Belarus; East Europe 2 = Armenia, Azerbaijan, Georgia, Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan; North Africa, excluding Egypt = Algeria, Morocco, Libya, Tunisia.

Notes: Table shows regression coefficients for country of birth/ancestry and generation, compared with ancestral Swedes' age gap in years (man-older). Models control for year of birth. G1 refers to the first generation, G2 refers to the second generation, 1950–69 and 1970–86 indicate year of birth, 'Difference G2 minus G1' denotes the difference between these generations, and '*' denotes whether this difference is statistically significant at the 0.05 level. Estimates for groups of fewer than ten individuals are not shown.

Source: As for Table 1.

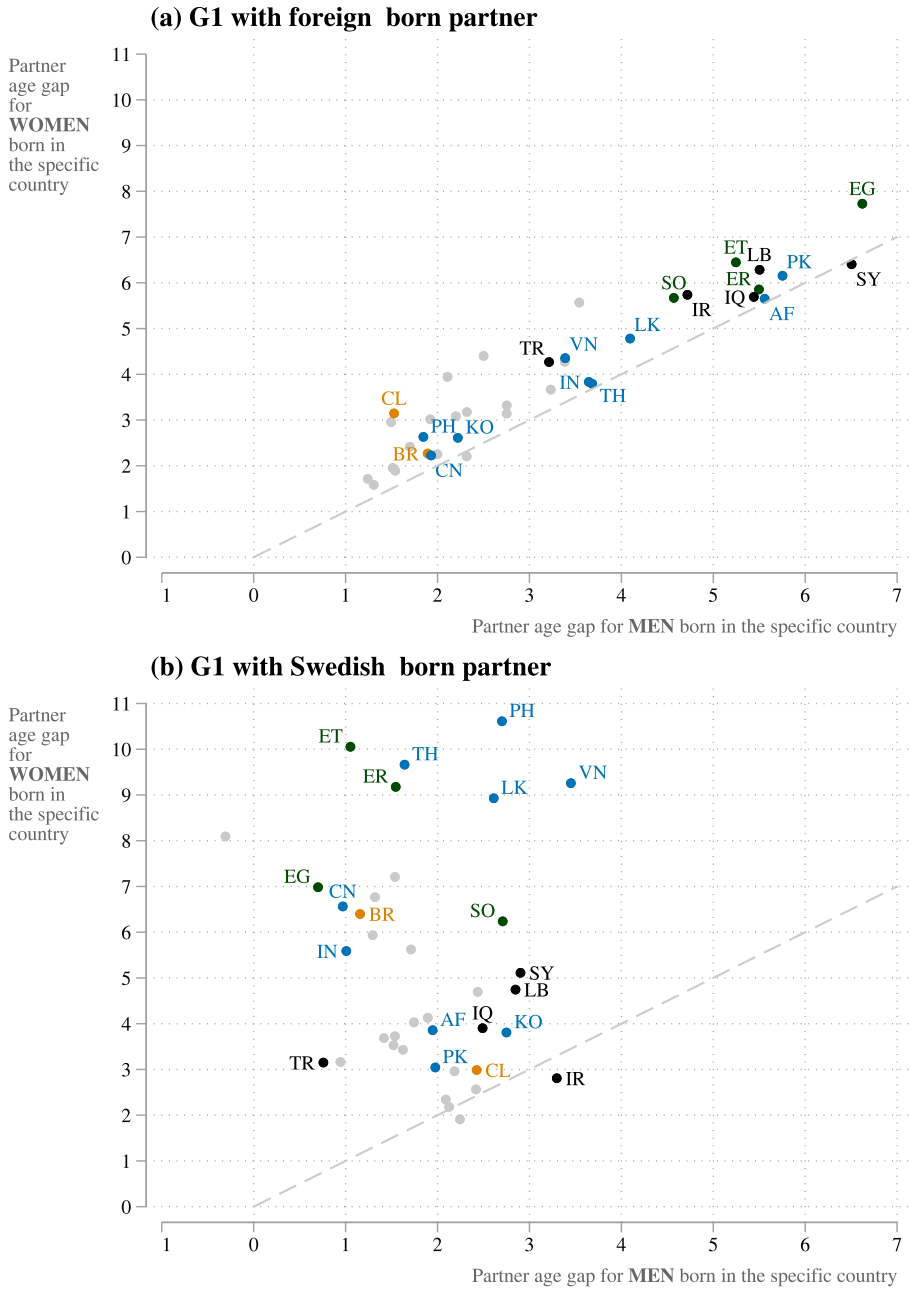

Figure 3 Partner age gap: Comparing G1 men and G1 women, by country of birth, separately for (a) those with a foreign-born partner; and (b) those with a Swedish-born partner

Note: Mean partner age gap refers to the man's age minus the woman's age, in years. Country codes are as follows: AF Afghanistan, BR Brazil, CL Chile, CN China, EG Egypt, ER Eritrea, ET Ethiopia, IN India, IQ Iraq, IR Iran, KO Korea, LB Lebanon, LK Sri Lanka, PH Philippines, PK Pakistan and Bangladesh, SO Somalia and Djibouti, SY Syria, TH Thailand, TK Turkey, VN Vietnam. See Figure 2 for colour coding. Grey circles represent European and North American countries and are left unlabelled here for greater readability.

Source: As for Figure 1.

gaps of G1 women and men if we analyse only first childbearing unions between immigrants from the same country of birth (Figure 3(a)). This can be contrasted with the pattern for immigrants who enter their first childbearing union with a Swedish-born partner (Figure 3(b)): sex differences in these binational unions are considerable. Among G1 men with Swedish-born partners, almost all mean age gaps are between one and three years, whereas G1 women exhibit a much broader range, with mean age gaps ranging between two and eleven years. The largest mean age gaps are for G1 women from the Philippines, Thailand, Vietnam, Sri Lanka, Ethiopia, and Eritrea (whose union is with a

Swedish-born man). Even if binational partnerships do not explain adaptation (as suggested by our supplementary regression results, Table A2), they certainly appear to explain the existence of large age gaps among G1, at least for women.

Arguably, the most robust assessment of intergenerational adaptation is a comparison between parents and their children. Among other things, an individual analysis of parent–child pairs enables us to disregard compositional differences between groups (i.e. many potential confounders) as an explanation for our results. Figure 4 shows that age gaps are almost always smaller for the children of immigrants (G2) than for their parents (G1). Although declines are small for women and men from almost all European and North American origins, they are nevertheless evident and typically more than one year. Importantly, many G2 children with parents from Africa, Asia, the Middle East, or Latin America, who started at higher levels, exhibit much smaller age gaps than their parents.

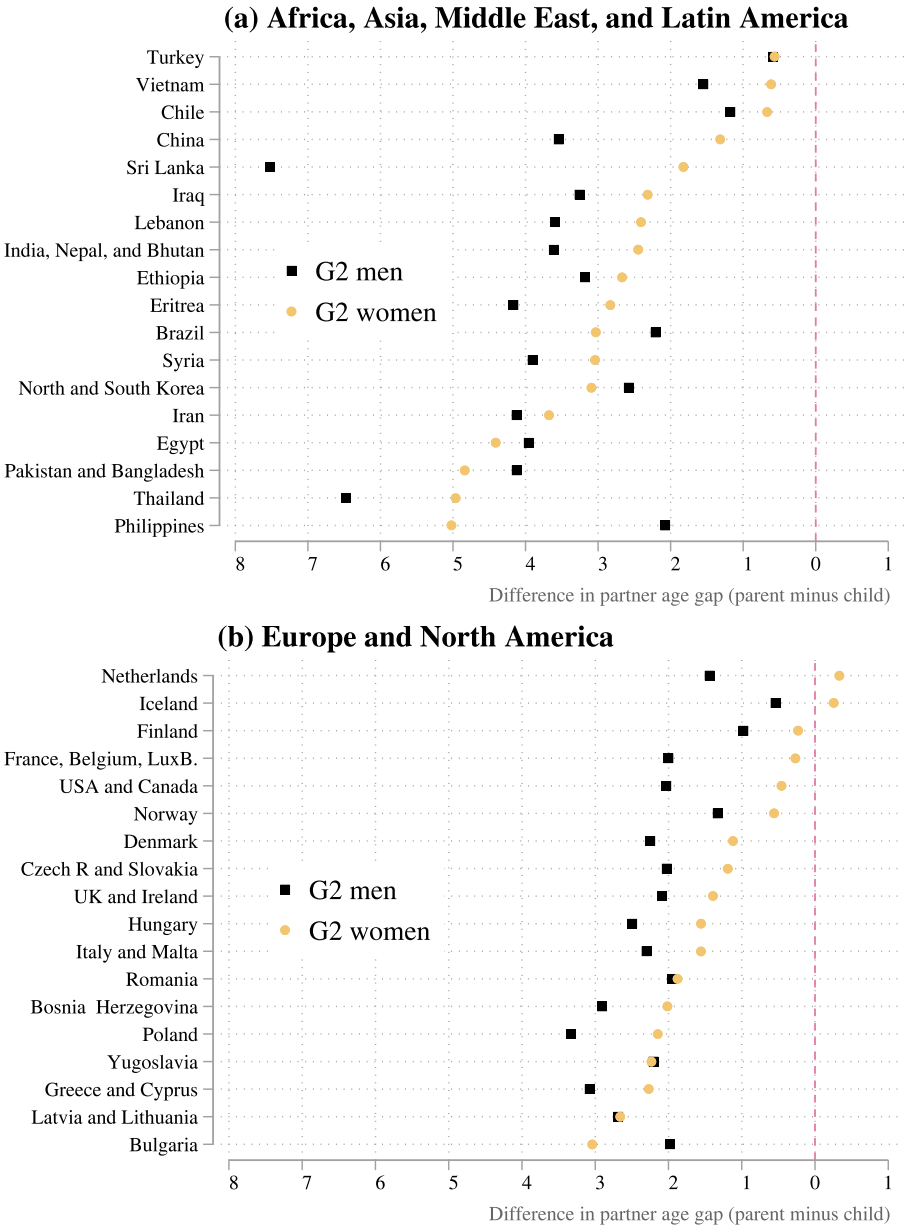

Figure 4 Difference in partner age gap (vs each individual's parent, in years) for G2 women and men, by selected country of ancestry: (a) Africa Asia, Middle East, and Latin America; and (b) Europe and North America

Note: Mean partner age gap refers to the man's age minus the woman's age, in years.
Source: As for Figure 1.

The intergenerational transmission of age gaps does appear to be different for women and men, with patterns varying according to the intersection between sex and migration background. In many cases, the differences between G2 children and their parents are larger for men, for example for those whose parents are from Thailand. However, sometimes the opposite is the case, for example for those whose parents are from the Philippines, Pakistan and Bangladesh, or Egypt. We note that the difference in age gaps is generally smaller when we compare G1 parents and their children who were born abroad (G1.5) (Figure A2(a), supplementary material), as opposed to G1 parents and their children who were born in Sweden (G2) (Figure 4). Moreover, the comparison between G1 parents and their G1.5 children does not change materially if we restrict the study population to those born in 1980 or earlier (i.e. aged 35 and above in 2016; Figure A2(b)). Not only does this show that the exclusion of younger cohorts makes little difference to comparisons between G1 parents and their children, but it also shows that intergenerational adaptation is already occurring for the G1.5, perhaps because they are socialized in Sweden prior to commencing childbearing.

Sensitivity analysis

We performed a number of additional analyses to examine the sensitivity of our results (see supplementary material). Most analysis in this paper focuses on the first childbearing union of individuals, some of whom may be entering this union with a partner who is already a parent. We expected the latter group to make little difference, not least because first unions are the first childbearing union for both partners in around 90 per cent of cases (although this varies with age). Nevertheless, we carried out supplementary analysis for only those unions where both partners became a parent for the first time (Table A4). We also analysed marital age gaps (Table A3), even though we believe that this measure is less useful for answering our research questions (see 'Background' section for reasons). Both additional analyses produced results that aligned with our main conclusions.

We also supplemented our analysis of mean age gaps by analysing age hypergamy (Table A5). More specifically, we examined the likelihood of being in a woman-older union or a union where the man is older by three years or more, compared with being in a union with a man who is up to two years older (as for the majority of unions among ancestral Swedes). For the majority of origins, G1 women and men were more likely than ancestral Swedes to be in a man-older union (three years or more) compared with being in a more age-homogamous union (reference, man up to two years older), whereas the same was not true for G2.

As a final sensitivity analysis, we examined whether evidence of adaptation is different for the children of parents who arrived in Sweden as refugees. This is particularly interesting because refugees may be less selective with respect to family formation in their decision to migrate, while also being more likely to face barriers to intergenerational adaptation. Yet, despite any such differences, the children of refugees did not appear to show consistently different intergenerational declines in age gaps, even when compared with the children of all immigrants from the same (parental) country of birth (Figure A3). In all our analyses therefore, the majority of origins exhibit mean age gaps that are more similar to ancestral Swedes for G2 than G1. Taken together, these sensitivity analyses support our main conclusions, which we discuss next.

Discussion

In this paper, we provide the first comprehensive analysis of partner age differences for immigrants and their descendants in any country. Our data cover the entire Swedish population, including a diverse range of origin countries, thereby allowing us to examine heterogeneity by origin. We use longitudinal information on all first childbearing unions, not only for individual immigrants but also for their children. These data allow us to investigate the adaptation of partner age gaps, considering change across time and generations, focusing on age gaps between partners with a common child.

Overall, our results provide considerable evidence of adaptation within the space of one generation: most children of immigrants exhibit age gaps that are closer to those of ancestral Swedes (Swedish-born children of Swedish-born parents), as compared with their parents and with members of their parents' generation who share the same immigrant background. This is particularly evident for those whose parents were born in countries with very different social and demographic contexts from Sweden. However, it is also evident for origins that are more similar to Sweden and less often the focus of studies on adaptation, for example Eastern Europe.

Divergence in age gaps between foreign-born women and men

For immigrants (G1), one of our key findings is the difference in age gap trends (by birth cohort) between women and men. The difference between immigrant mothers and Swedish mothers is much higher for more recent cohorts (Figure 1). In other words, G1 women exhibit evidence of divergence across time, whereas the opposite is the case for G1 men. There are two main explanations for this sex difference. The first is differences between G1 birth cohorts in terms of selection into migration (and arrival and residence in Sweden). We noted earlier that immigration to Sweden was characterized by labour migration after the Second World War and then shifted when refugee migration became the dominant form during the 1980s, continuing during the 1990s (Statistics Sweden 2004). Although we analyse birth year not arrival year, our results may reflect changes in the numbers of immigrants arriving from specific origins, including differences by sex. For example, more recent cohorts may include relatively more women from origins where man-older relationships are more prevalent. That said, there is clear, homogeneous evidence of diverging trends for women and men from Latin America, Asia, Africa, and the Middle East.

A second explanation for these sex differences in cohort trends is sex differences in partnership behaviour, including differences in the rates of binational partnership (defined as partnering with a Swedish-born person). There are evident sex differences in these binational partnerships, which can be seen in our analysis of G1 age gaps by partner's country of birth (Figure 3). In particular, when limiting our analysis to immigrants with Swedish-born partners, the differences in mean age gaps between women and men from the same country of birth are often considerable. For example, for G1 women from Philippines, Thailand, Vietnam, Sri Lanka, Ethiopia, and Eritrea, their Swedish-born partner is on average eight to eleven years older than them. This can be compared with men from the same origin countries, whose mean age gap is never more than four years.

Intergenerational adaptation

One of our most distinct findings is the difference in age gaps between G1 and G2. Overall, we find strong evidence of intergenerational adaptation, not only when comparing generations at the macro level by (parental) country of birth (as in Figure 2 and Table 2), but also when making a direct comparison between parents and their children (as in Figure 4). Our sensitivity analyses results offered additional support for this conclusion. There is heterogeneity among the children of immigrants—by sex, as well as by country of birth, age at arrival, and refugee status of their parents—but in general they have adapted to the Swedish age gap norm, which has been stable at around two years (man older).

As noted in the results, mean age gaps (as an aggregate marker of adaptation) may be underestimated for men and overestimated for women until childbearing is complete. For this reason, we may expect mean age gaps to be slightly lower for G2 women born 1970–86 once they complete childbearing, potentially resulting in even stronger evidence of adaptation (e.g. in Figure 2), whereas the opposite may be true for men. For the majority of origin countries, the difference between parents and children is larger among men than among women, with some exceptions (Figure 4), and our supplementary analysis shows that sex differences for specific origins may vary depending on the cohorts analysed (Figures A2(a) and A2(b)). Nevertheless, even after dropping cohorts born after 1980 (i.e. aged <36 in 2016), the difference between parents and children remains larger among men (for G1.5).

Sex differences in adaptation may relate to differing partnership opportunities and constraints among children of immigrants. For example, daughters of immigrants may be subject to higher parental expectations to adhere to origin norms than their brothers (Hampshire et al. 2012). However, little is known about such dynamics in Sweden. Research for the Netherlands suggests that female immigrants from Turkey and Morocco are much more likely (than males) to experience parental involvement in partner choice (Van Zantvliet et al. 2014). Parental involvement may affect opportunities for foreign-born women to interact with Swedish society and its institutions (e.g. schools, communities, and workplaces). Male children of immigrants may also be better able to ignore the partnership norms of their parents or hold different individual preferences regarding partner's age.

Our evidence of intergenerational adaptation for G2, both women and men, suggests that spending your entire childhood in Sweden is a strong determinant of partner age gap. However, considerable heterogeneity remains by parental country of birth. Intergenerational adaptation is most evident for African, Middle Eastern, and some Asian origins, where age gaps for G1 are most different from the

Swedish norm (Figure 2). There is also a lot of heterogeneity within regions—for example when comparing different African, Middle Eastern, or Eastern European origins. Our results show that migration background matters when analysing the age gaps of immigrants and their descendants. In addition, partner's migration background appears to play an important role in explaining the heterogeneity of age gaps among immigrants (Figure 3).

At the macro level, adaptation to the Swedish norm may suggest the uptake of local norms pertaining to partnership and family formation. There are several ways that this might occur. First, adaptation might arise because of cultural adaptation, where individuals' preferences for a partner of a given age start to resemble those of native-born Swedes with Swedish-born parents. In addition, if parental attitudes start to resemble those of Swedish-born parents, or if immigrant parents have less influence over their children's partner choice over time, age gaps may show signs of adaptation. Second, it may be that any adaptation is unrelated to partnership norms directly, but driven by the uptake of *other* preferences or norms linked with partnership. Third, adaptation of age gaps may be unrelated to norms and instead driven by economic or structural factors. Adaptation may occur because the children of immigrants face similar opportunities and constraints to the mainstream Swedish population, for example in terms of enrolment in higher education and economic opportunities.

These potential explanations for adaptation are not mutually exclusive, and structural determinants are likely to be correlated with cultural determinants, even if not causally interrelated. This is one reason why it has been so difficult for prior research on intermarriage and partnership across origin countries to disentangle the roles of preferences, norms, and opportunities (Kalmijn and van Tubergen 2010). Disentangling these explanations lies beyond the remit of our study: it is not possible to draw strong conclusions about the determinants of individual partnership behaviour from our analysis. Our goal was to analyse macro-level trends in age gaps comprehensively—as a means of understanding whether adaptation is occurring—not to uncover the underlying mechanisms for these trends. Similarly, observed behaviours should not be taken as a direct reflection of changing partner preferences. Any union is likely to be subject to important trade-offs between desired partner characteristics. A more direct indication of which traits individuals prefer in a partner can be assessed only using different types of information, such as surveys or qualitative data. We recommend more research that develops the complexities of the destination norm, which we operationalized as an average, but which varies considerably, even among ancestral natives.

Note that the partnership history of G1 immigrants varies on arrival: some arrive with a partner, some without a partner, and some in tandem with a partnership event. This is why our comparisons between G1 adult immigrants and their G2 descendants should not be taken as a measure of difference in age gaps between origin and destination countries. It is possible that adaptation coincides with, or is related to, trends towards smaller age gaps in origin countries, but given the lack of comparable origin-country data we were unable to examine this explanation empirically. When seeking to generalize our results or compare with other contexts, readers should be aware of Sweden's high gender equality, free tertiary education, and social policies that enable women—regardless of background—to combine childbearing and labour market activities, and to delay childbearing and union formation if they wish. It is uncertain whether similar patterns of adaptation would be seen in other contexts, especially those not sharing Sweden's long history of a relatively stable mean period age gap. Also note that we excluded individuals with one Swedish-born and one foreign-born parent (G2.5), who may be more likely to adapt to Swedish norms than G2. Sweden is uniquely positioned to test adaptation over time and generations due to its long history as a receiving country of immigrants from a diverse range of countries, and more research on Sweden could provide greater clarity on the determinants of age gap adaptation, including the impact of parental partnership choices on their children's partnership behaviour. In addition, more research on other destination contexts is needed to examine the generalizability of our results.

In summary, our results show clear evidence of adaptation for the children of immigrants in Sweden. We also identified considerable variation in mean age gaps for different groups of immigrants and their descendants. Although parental age gaps have been studied before, they have rarely been examined for immigrants specifically, let alone for the children of immigrants. The results of our study indicate the value of doing so and pave the way for future research. We focused on age gaps as a behavioural outcome, but they may also be a marker of distinct circumstances, which in turn may determine life

course trajectories. For example, couples with a smaller age gap also have higher earnings (Dribe and Nystedt 2017; Carollo et al. 2019). Their risk of separation is also lower, irrespective of migration background (Uggla et al. 2020). Future research could contribute by examining whether age gaps are a strong determinant of social outcomes for immigrants and their descendants, while acknowledging that selection into age-homogamous unions is likely to differ considerably by migration background.

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3 This analysis is produced under the Swedish Statistics Act, where privacy concerns restrict the availability of register data for research. The authors used collections of register data held at Stockholm University, under ethical approval from the Swedish authorities. The authors accessed the individual-level data through Statistics Sweden's micro-online access system, MONA.

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