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Interaction between childbearing and partnership trajectories among immigrants and their descendants in France: An application of multichannel sequence analysis

Isaure Delaporte  and Hill Kulu 
University of St Andrews

While there is a large literature investigating migrant marriage or fertility, little research has examined how childbearing and partnerships are interrelated. In this paper, we investigate how childbearing and partnership trajectories evolve and interact over the life course for immigrants and their descendants and how the relationship varies by migrant origin. We apply multichannel sequence analysis to rich longitudinal survey data from France and find significant differences in family-related behaviour between immigrants, their descendants, and the native French. Immigrants' family behaviour is characterized by stronger association between marriage and childbearing than in the native population. However, there are significant differences across migrant groups. Turkish immigrants exhibit the most conservative family pathways. By contrast, the family behaviour of European immigrants is similar to that of the native population. The study also demonstrates that the family behaviour of some descendant groups has gradually become indistinguishable from that of the native French, whereas for other groups significant differences in family behaviour persist.

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Keywords: immigrants; second generation; fertility; partnership; assimilation; multichannel sequence analysis; life course approach

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Introduction

Family trajectories have become increasingly complex in Europe, and the link between partnership choices and fertility decisions has changed. Family formation and childbearing used to be associated mainly (or only) with marriage. However, with increased non-marital cohabitation (Sobotka and Toulemon 2008), separation, divorce, and remarriage, the relationship between partnership and fertility has changed and become more complex. The proportion of individuals having children while unpartnered or within cohabitation has increased (Heuveline et al. 2003). Moreover, family patterns differ significantly across population groups, by education, migrant status, and other socio-demographic characteristics. As immigrants and their descendants play an increasing role in the cultural and social

landscape of European societies, it is important to understand the family dynamics of migrant populations.

A large number of studies have examined the fertility and partnership behaviour of immigrants and their descendants. Overall, immigrants (especially from low-income countries) in Europe exhibit higher fertility levels than the native born (Milewski 2007, 2010; Kulu and Hannemann 2016a; Andersson et al. 2017; González-Ferrer et al. 2017; Kulu et al. 2017, 2019; Pailhé 2017; Puur et al. 2017). Immigrants often show different partnership patterns from the native population (Andersson et al. 2015; Hannemann and Kulu 2015; Pailhé 2015; Rahnu et al. 2015; González-Ferrer et al. 2016; Kulu and Hannemann 2016b; Hannemann et al. 2020). However, most existing studies on immigrants' family behaviour have investigated either migrant

marriage or migrant fertility (see Kulu and Milewski 2007; Kulu and González-Ferrer 2014; Kulu and Hannemann 2016b; Hannemann et al. 2020, for a review of the literature). Little research has examined how childbearing and partnership behaviour are intertwined among migration populations. Furthermore, existing studies have usually investigated immigrants (Kulu and González-Ferrer 2014), whereas family patterns of the descendants of immigrants have been less studied (Pailhé 2017).

This study addresses two research questions: (1) How do childbearing and partnership behaviour evolve and interact over the life course of immigrants and their descendants compared with the native born; and (2) Does the interplay between fertility and partnerships differ by migrant origin and, if so, how? The simultaneous analysis of partnership and fertility will provide the opportunity to determine the pathways that different migrant groups and generations experience over their family life course. It will improve our understanding of the factors influencing immigrants' family dynamics and the determinants of their socio-cultural integration. We use multichannel sequence analysis (MCSA) to investigate fertility and partnership trajectories simultaneously, for both immigrants and their descendants. This technique extends the conventional optimal matching analysis (OMA) to examine multiple life spheres simultaneously. To the best of our knowledge, this innovative technique has not been applied to date in research on migrants and their descendants.

We focus on the family dynamics of immigrants and immigrants' descendants in France for two reasons. First, the diversity of the French population makes it a relevant case study; not only is the country home to a significant immigrant population, but there are also many descendants of immigrants living in France. Second, the paper exploits a rich French longitudinal survey named Trajectories and Origins, which collected information in 2008 on immigrants, their descendants, and the native French. The survey contains retrospective biographical data on individuals' childbearing histories, including the month and year of each birth. It also includes information on individuals' partnership histories, with the month and year of first and current co-residential union or marriage and the month and year of first separation. Finally, it provides detailed information on individuals' socio-demographic characteristics. This allows us to look closely at fertility and partnership dynamics among immigrants and their descendants, for both men and women.

Our study applies MCSA to data from the Trajectories and Origins survey. Individuals are grouped into different clusters according to the differences in their family trajectories. This allows us to identify the main family trajectories of immigrants and their descendants in France. Individuals are observed from age 15 to age 35 to facilitate comparison across different birth cohorts and migrant generations. Finally, a multinomial logistic regression model is used to determine associations between individual socio-demographic characteristics and the obtained clusters. Our results show important differences in family-related behaviour between immigrants, their descendants, and the native French population. There is also considerable heterogeneity in family trajectories across migrant groups.

Theoretical framework

Family trajectories have become increasingly diverse in many Western countries (Pinnelli et al. 2002; Billari 2005; Sobotka and Toulemon 2008; Thomson 2014). France is no exception: partnership behaviour has changed significantly since the 1970s (Beaujouan and Wiles-Portier 2011). Non-traditional family behaviour—such as living together, having children outside marriage, divorce, and separation—has gradually become acceptable in France. Furthermore, many individuals now experience more than one cohabiting union or marriage. Family formation has also been postponed in recent decades (Testa and Toulemon 2006). An increasing proportion of individuals have their first child in a second or subsequent union. The proportions of non-marital births and births in reconstituted families are growing. Moreover, a larger proportion of couples with children are separating than in the past, and more often, individuals who repartner are already parents. Yet, these changes in family patterns are not necessarily observed among all minority populations (Pailhé 2015).

Theories on migration and family dynamics

There are five main hypotheses in the literature about the relationship between migration and family dynamics: socialization, selection, disruption, interrelation of life events, and adaptation (Kulu 2005). The *socialization* hypothesis (Andersson 2004; Kulu and Milewski 2007) states that the norms and values that immigrants have been

exposed to in their upbringing influence their behaviour over the life course. According to this hypothesis, immigrants will follow a conservative family pathway (e.g. children within marriage) and their fertility will be high relative to the native born, since many come from origin countries with conservative values. Therefore, the association between marriage and childbearing will be stronger for them than for the native population. By contrast, the *selection* hypothesis contends that people who move from one social environment to another may have specific characteristics that distinguish them from the population in the country of origin (Docquier et al. 2017). In particular, they might already be more inclined to adopt the norms of the destination country. This could be reflected in a higher likelihood of cohabitation and separation and also in higher levels of non-marital childbearing. In this case, the hypothesis predicts that the two domains—fertility and partnership—will be less intertwined.

The two subsequent hypotheses—the disruption hypothesis and the hypothesis of interrelation of life events—focus on the impact of the move itself (Wolf 2016). The *disruption* hypothesis posits that migration is a stressful event that entails significant economic costs, disconnection of social networks, and psychological pressure, all of which may affect fertility and partnership dynamics before and on arrival in the receiving country (Cantalini and Panichella 2019). The hypothesis of *interrelation of life events* states that migration often occurs simultaneously with other life events (Mussino and Strozza 2012). For instance, migrating for family reunification purposes is often associated with an increase in fertility (Robards and Berrington 2016). Therefore, these two hypotheses place emphasis on the time of arrival to explain changes in both the fertility and partnership trajectories of immigrants.

Lastly, the *adaptation* hypothesis (Andersson 2004; Andersson and Scott 2005) considers the arrival context the most important. This context involves two dimensions: resources and cultural norms. The former refers to the living and opportunity costs associated with the host community. Resources have significant effects on childbearing and partnership decisions. For instance, housing quality and size influence family dynamics (Kulu 2005). Poor education and labour market prospects also impact childbearing and partnership decisions (Coleman and Dubuc 2010; Lundström and Andersson 2012; Dupray and Pailhé 2018). More specifically, low education and low employment opportunities are often associated with more

conservative family pathways. The second dimension of the adaptation theory concerns migrants' assimilation of the receiving country's cultural norms. Immigrants tend to adopt the host country's norms, but as this adaptation to new cultural norms takes time, the changes are mostly visible across migrant generations. These changes imply that the descendants of immigrants will adopt less conservative family behaviour than their parents, and thus the link between childbearing and marriage will become weaker over time.

In the case of the descendants of immigrants, both the socialization and adaptation hypotheses help us to understand their life trajectories. On one hand, the second generation may grow up under the influence of a *minority subculture* and thus exhibit fertility and partnership dynamics that are similar to those of their parents but different from the behaviour of the native population. On the other hand, the descendants of immigrants may grow up under the influence of the *mainstream society* and thus show behaviour similar to that of the native population (Milewski 2010; De Valk and Milewski 2011; Kulu and Hannemann 2016b; Hannemann et al. 2020). In fact, the descendants of immigrants often hold multiple identities (Delaporte 2019). First, specific family values and norms are expected to persist among descendants of immigrants. This is known as their minority identity. This might be because they willingly remain attached to the traditions and norms of their parents' country of origin or because they want to avoid being socially sanctioned by members of their own ethnic group. Second, alongside their minority identity, some children of immigrants may adopt the norms of the majority population. In addition, several other factors may contribute to shaping an individual's identity: for example, social networks, school socialization, the media, and nation-building policies. As a result, the descendants of immigrants often exhibit family patterns that are *in between* those of immigrants and the native born (Kulu and González-Ferrer 2014).

Differences in partnership trajectories among immigrant populations

The existing literature compares the *partnership* dynamics of immigrants and their descendants with those of native populations (Hannemann et al. 2020). In the French context, previous studies have found notable differences in the partnership behaviour of immigrants compared with the native born.

For instance, while cohabitation has become the dominant mode of partnership formation for the native French, a large proportion of migrants marry directly without cohabiting first (Pailhé 2015). There is more heterogeneity among the second generation in France. Some descendant groups, particularly those whose parents come from Southern Europe, exhibit lower marriage rates than immigrants, and their union formation and dissolution patterns are similar to those of the native population. However, in other groups, such as the descendants of Turkish or North African immigrants, a high proportion still marry directly; they also enter their first union relatively early compared with the native born.

Differences in partnership trajectories across migrant groups are also observed in other European countries. For instance, in Sweden, risks of first marriage formation, divorce, and remarriage are lower for immigrants from Southern Europe compared with native Swedes (Bernhardt et al. 2007; Andersson et al. 2015). By contrast, immigrants from the Horn of Africa, Northern Africa, the Arab Middle East, Iran, and South Asia exhibit elevated levels of first marriage formation, as well as high rates of divorce and remarriage (Andersson et al. 2015). In the UK also, immigrants with different origins differ from each other in their partnership patterns (Hannemann and Kulu 2015; Berrington 2020). For instance, the highest cohabitation and lowest marriage rates are seen among immigrants of Caribbean origin, whereas cohabitation remains rare among immigrants from South Asia and their descendants, as most marry directly (Hannemann and Kulu 2015). Furthermore, immigrants from the Caribbean region and their descendants show higher divorce rates than native British women, whereas the divorce risk is lower for women of South Asian origin.

In Spain, immigrant women generally display higher union (particularly cohabitation) formation rates and higher separation rates compared with native Spanish women (González-Ferrer et al. 2016). In the Netherlands, immigrants of Turkish and Moroccan descent prefer younger ages at marriage compared with the native born (De Valk 2006; De Valk and Liefbroer 2007). Lastly, in Estonia, the difference between migrants and the native population is most pronounced in the mode of partnership formation and outcomes of cohabiting unions, whereas the results pertaining to union dissolution reveal no difference between population groups (Rahnu et al. 2015).

Differences in fertility trajectories among immigrant populations

A closely related strand of the literature examines the *fertility* dynamics of immigrants and their descendants. In most European countries, total fertility is high among immigrants (Pailhé 2017; Volant et al. 2019) and their fertility rates are elevated in the first years after migration (Tønnessen and Mussino 2020). Furthermore, immigrants often experience an earlier transition to parenthood than the native born (González-Ferrer et al. 2017; Rojas et al. 2018). However, there are clear differences in the fertility behaviour of immigrants from different migrant groups (Mussino and Strozza 2012; Impicciatore et al. 2020).

In France, some migrant groups (e.g. Southern Europeans) exhibit fertility levels similar to those of the native population, while other ethnic minorities (e.g. people of Turkish origin) display higher fertility (Pailhé 2017). In Italy, the fertility rates of immigrants from Morocco remain significantly higher than those of native Italians. By contrast, other migrant groups exhibit childbearing behaviour that is closer to that of native Italians. Similarly, in Germany, research has suggested that immigrants' transition rates to second and third births vary by country of origin, being higher among people of Turkish descent than in other groups (Milewski 2007, 2010; Krapf and Wolf 2016). In Spain, immigrants from Latin America hold similar expectations to native Spaniards in terms of fertility levels (Kraus and Castro-Martín 2018), while those from North African countries are more likely to experience transitions to second and third births (González-Ferrer et al. 2017). In the UK, there is little variation in first-birth rates between the native born and descendants of migrants. However, relatively high third- and fourth-birth rates are responsible for the elevated total fertility among certain descendant groups, especially women of Pakistani and Bangladeshi origin (Coleman and Dubuc 2010; Kulu and Hannemann 2016a; Wilson 2019).

There is evidence of a convergence towards native-born fertility levels in several European countries. However, this is a slow process. For instance, in the Netherlands, immigrant women of Turkish and Moroccan origin have adjusted their fertility levels only slowly to the level of native Dutch women (Garssen and Nicolaas 2008). Still, their fertility is declining (Schoorl 1990). Fertility rates of the descendants of immigrants, on the other hand, are virtually the same as those of native Dutch women.

In Sweden, this convergence is observed for the 1.5 generation, that is, immigrants who arrived in Sweden as children (Scott and Stanfors 2011; Carlsson 2018). Most groups exhibit even lower fertility than native Swedes (Andersson et al. 2017). In Germany, the fertility patterns of migrant descendants more closely resemble those of West Germans than those of immigrants (Milewski 2007, 2010; Krapf and Wolf 2016). The influence of country of origin is also weaker if one parent is from Germany or if the parents are immigrants from two different countries (Stichnoth and Yeter 2016). In the Netherlands, the descendants of immigrants are much closer to native women in their fertility behaviour than to their mothers (Garssen and Nicolaas 2008). Lastly in Estonia, Russian migrants' propensities to have a second and third birth are lower than for the native population (Puur et al. 2017). This pattern extends to the descendants of migrants.

Hypotheses

In line with the existing literature, we expect a stronger association between marriage and childbearing for immigrants than for the native French (Hypothesis 1(a)). Immigrants are expected to exhibit lower levels of cohabitation, non-marital childbearing, and separation, and also higher levels of fertility within marriage than the native born. By contrast, the descendants of immigrants often exhibit patterns that are in between those of immigrants and the native population. Therefore, we expect to observe more heterogeneity in the family trajectories of the descendants of immigrants and expect their trajectories to be similar to those of the native born (Hypothesis 1(b)); in other words, the association between fertility and marriage should be weaker. A larger proportion of descendants are expected to have children while unpartnered and within cohabitation compared with immigrants, and we expect descendants to experience higher levels of separation.

The existing literature has provided evidence for significant differences in family behaviour across migrant groups in France (Pailhé 2015, 2017). Therefore, for immigrants from countries with conservative family values (e.g. Turkey and North Africa) we expect childbearing to be associated mostly with marriage (Hypothesis 2(a)). By contrast, for immigrants from countries culturally similar to France (e.g. other Europeans), we expect childbearing to take place also outside marital unions

(Hypothesis 2(b)). We expect the descendants of immigrants to exhibit more polarized family patterns than immigrants. Some groups, such as the children of Turkish and North African immigrants, are likely to exhibit family trajectories that closely resemble those of their parents (Hypothesis 2(c)). By contrast, we expect the family behaviour of the children of European immigrants to be similar to that of the native French (Hypothesis 2(d)).

Data

To investigate the family patterns of immigrants and their descendants in France, this paper relies on the Trajectories and Origins survey conducted in 2008 by the French National Institute for Demographic Studies (INED) and the French National Institute of Statistics and Economic Studies (INSEE). This survey provides valuable information on integration of immigrants and their descendants in France. Immigrants are identified as individuals born abroad. The descendants of immigrants are individuals born in metropolitan (mainland) France with at least one immigrant parent, whereas the native French are defined as individuals born to two French-born parents. The survey contains retrospective biographical data concerning individuals' fertility histories, in particular the month and year of each birth. It also includes information on individuals' partnership histories: the month and year of first and current co-residential union or marriage and the month and year of first separation. Lastly, the survey provides detailed information about individuals' socio-demographic characteristics.

The initial sample consisted of 20,380 individuals. However, we excluded 1,893 individuals with missing or inconsistent information in their life histories. This is preferable, since sequences with missing data are a serious problem for sequence analysis (Piccarreta and Studer 2019). Nevertheless, we conducted a sensitivity analysis (see Appendix A in the supplementary material), which confirmed that our results are robust to the reduction in sample size. We also excluded from the analysis 644 individuals who were born in 1990–99, since they were too young at the time of interview in 2008 to have experienced any significant changes in their family life. The final sample includes 17,843 individuals (men and women): 7,408 immigrants, 7,392 descendants of immigrants, and 3,043 native respondents. It should be noted that migrant groups were oversampled in order to conduct statistically reliable analyses of small groups. We

observe the full partnership and fertility histories for all individuals.

Table 1 provides general information about the composition of the sample. Nearly half of the sample members are men. The descendants of immigrants are, on average, younger than immigrants and the native French. The immigrants are classified into groups based on their country of birth, whereas descendants are categorized based on the country of birth of their parents. Specifically, descendants are classified into the origin group of their parents if both parents are immigrants and were born in the same region. Otherwise, they are classified into the origin group of their father/mother if only one is a migrant. The descendants of immigrants with parents born in different regions (5 per cent) are not included in specific origin groups to avoid any bias resulting from mixed backgrounds. Immigrants come mostly from North Africa (26 per cent), sub-Saharan Africa (20 per cent), and Southern Europe (17 per cent); for the descendants of immigrants, the main groups are North Africans (32 per cent) and Southern Europeans (31 per cent). Four birth cohorts are examined: individuals born in 1948–59, 1960–69, 1970–79, and 1980–89.

Methods

The standard applications of OMA have been limited to one dimension at a time. To study fertility and partnership trajectories simultaneously, the analysis requires an extension of the usual OMA to multiple life spheres. This is possible with the MCSA technique. This method has a number of advantages (Spallek et al. 2014). First, MCSA accounts simultaneously for local interdependencies among different social statuses present at each point of the alignment process for all channels. As a result, it provides more reliable alignments than two independent OMAs (Gauthier et al. 2010). Second, MCSA offers practical improvements towards visualizing parallel processes occurring in various life spheres (Piccarreta and Lior 2010).

To carry out this analysis, each individual's life course was represented by a sequence of states, which were recorded for each month, from the month when an individual became 15 until the month when the interview was conducted. For the purpose of this study, sequences were constructed for each of the two life domains: fertility and partnership. Fertility status is based on the following

Table 1 Sample composition: immigrants, descendants, and native population

	Immigrants		Descendants of immigrants		Native population	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Male	3,456	47	3,512	48	1,418	47
Female	3,952	53	3,880	52	1,625	53
<i>Region of origin</i>						
North Africa ¹	1,802	24	2,235	30	–	–
Sub-Saharan Africa ²	1,400	19	828	11	–	–
South East Asia ³	997	13	615	8	–	–
Turkey	794	11	377	5	–	–
Southern Europe ⁴	1,224	17	2,234	30	–	–
Other Europe ⁵	831	11	669	9	–	–
<i>Birth cohort</i>						
1948–59	2,109	28	381	5	638	21
1960–69	2,217	30	1,369	18	875	29
1970–79	2,075	28	2,266	31	794	26
1980–89	1,007	14	3,376	46	736	24
<i>N</i> = 17,843 individuals	7,408	100	7,392	100	3,043	100

¹North Africa' refers to Algeria, Morocco, and Tunisia.

²Sub-Saharan Africa' refers to Senegal, Mauritania, the Gambia, Guinea-Bissau, Guinea, Mali, Burkina Faso, Niger, Chad, Ivory Coast, Ghana, Togo, Benin, Nigeria, Cameroon, Central African Republic, Gabon, Republic of the Congo, DRC, and Equatorial Guinea.

³South East Asia' refers to Vietnam, Laos, and Cambodia.

⁴Southern Europe' refers to Portugal, Italy, Spain, Greece, Cyprus, and Malta.

⁵Other Europe' refers to Austria, Germany, Luxembourg, Denmark, Sweden, Finland, United Kingdom, Ireland, Belgium, the Netherlands, Bulgaria, Estonia, Hungary, Latvia, Lithuania, Poland, Czech Republic, Romania, Slovenia, and Slovakia.

Notes: Among immigrants, we do not report smaller origin groups (these groups constitute 5 per cent of all immigrants). Among the descendants of immigrants, those with parents born in different regions (5 per cent) are not included in specific origin groups to avoid any bias resulting from mixed backgrounds.

Source: Trajectories and Origins survey 2008, France; authors' own calculations.

categories: ‘childless’, ‘one child’, ‘two children’, ‘three children’, and ‘four children or more’. Partnership states are categorized as ‘single’, ‘first cohabitation’, ‘first marriage’, ‘separation’, ‘repartnered, cohabiting’, and ‘repartnered, married’.

Due to the large number of possible combinations of states, few individuals experience the exact same sequence of states. To simplify the inspection of the most typical patterns in the data, we first used a dissimilarity measure. We computed the distance between pairs of sequences by identifying how similar they were in terms of the number, order, and duration of states. Using this method, the dissimilarity between two sequences is then calculated by taking into account three possible operations: replacement (one state is replaced by another), insertion (an additional state is added to the sequence), and deletion (a state is deleted from the sequence). A certain cost is attached to each operation. The distance between two sequences is thus defined by the minimum cost of the operations (replacement, insertion, or deletion) that is required for two sequences to become identical (Abbott 1995; Abbott and Tsay 2000; Billari 2001; Barban and Billari 2012; Mikolai and Lyons-Amos 2017). These distances are stored in a dissimilarity matrix.

At this stage, the researcher must make a number of decisions which can influence the results. For instance, the choice of distance measure and the definition of the costs attached to different operations can be arbitrary (Wu 2000; Lesnard 2010; Studer and Ritschard 2016). Regarding the dissimilarity measure, we used optimal matching with a cost of ‘1’ for insertion and deletion operations (indel costs), while for substitution operations, a substitution-cost matrix was constructed using the transition rates between states observed in the sequence data. However, given the limitations of using data-driven costs and to make sure that our results hold, we conducted additional analyses. More specifically, we used the longest common subsequence (LCS) measure, which is a measure that is sensitive to spell durations. This allowed us to investigate duration of marriage and the delay between marriage and birth of the first child, which are important features when studying differences in family formation trajectories. This analysis led to similar results to the main analysis (see Figure B1, Appendix B in the supplementary material).

Moreover, due to the right-censored data, we observed some variation in the length of sequences. This needed to be addressed, since censored sequences are a serious issue for sequence analysis

(Piccarreta and Studer 2019). We examined the proportion of right-censored life histories in the sequence data when including all individuals irrespective of their birth cohort (those born between 1948 and 1989). Unsurprisingly, the longest sequences were for the 1950 cohort while the shortest sequences were for the 1980 cohort. Overall, the highest proportion of right-censored individuals was found among the descendants of immigrants, since they are the youngest in our sample. When observing all individuals from age 15 to age 50, the proportion of missing states was 39 per cent (Figure B2, Appendix B in the supplementary material). To minimize the issue of censored sequences, we decided to examine all individuals from age 15 to age 35. This resulted in only 19 per cent of states missing (Figure B3, Appendix B in the supplementary material).

We then conducted hierarchical cluster analysis on the dissimilarity matrix to partition cases into groups with similar family trajectories. For the clustering, we used Ward’s method because it typically produces usable and relatively evenly sized clusters compared with other clustering methods (Helske et al. 2018). We also decided to retain four cluster solutions, based on the dendrogram (Figure B4, Appendix B in the supplementary material), goodness-of-fit statistics, and interpretability of the clusters. Lastly, once individuals had been classified into different clusters, a multinomial logistic regression model was used to analyse how individual socio-demographic characteristics predict belonging to a specific cluster. More specifically, the following equation was estimated:

$$\ln \frac{p(\text{Cluster}_i = m)}{p(\text{Cluster}_i = 1)} = \alpha_m + \sum_{k=1}^K \beta_{mk} X_{ik} \quad (1)$$

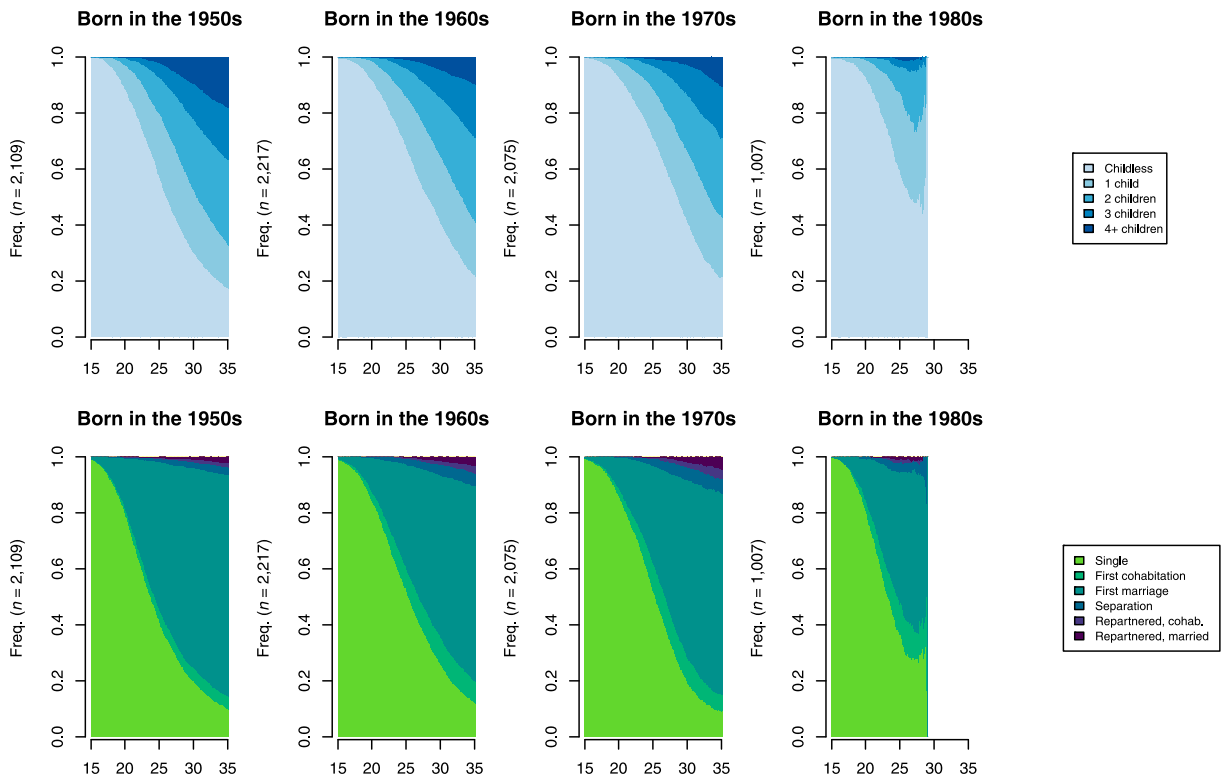
where the dependent variable Cluster_i is an unordered categorical variable, with m potential outcomes (one for each cluster). The base outcome or reference category is the trajectory of Cluster 1. X_{ik} represents a set of explanatory variables for individual i and outcome k . To avoid anticipatory analysis, X_{ik} includes only time-constant variables, such as sex, birth cohort, and migrant origin.

Results

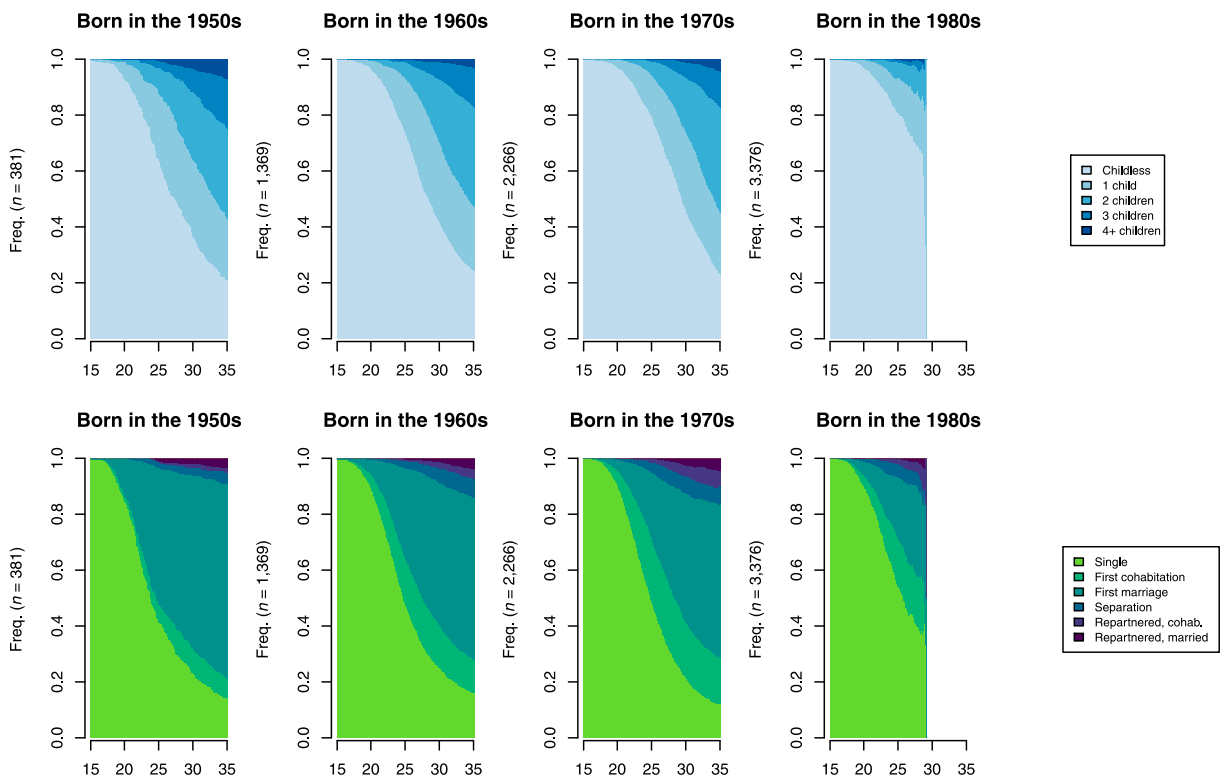
Descriptive analysis

Figure 1 presents the state distribution plots by birth cohort separately for: (a) immigrants; (b) their

(a) Immigrants



(b) Descendants of immigrants



descendants; and (c) the native population. The upper panels represent individuals' fertility trajectories, while the lower panels show the partnership trajectories. Each state is represented by a different

colour. In addition, Figures C1 and C2 (Appendix C in the supplementary material) provide the state distribution plots for immigrants and their descendants separately by origin group.

(c) Native population

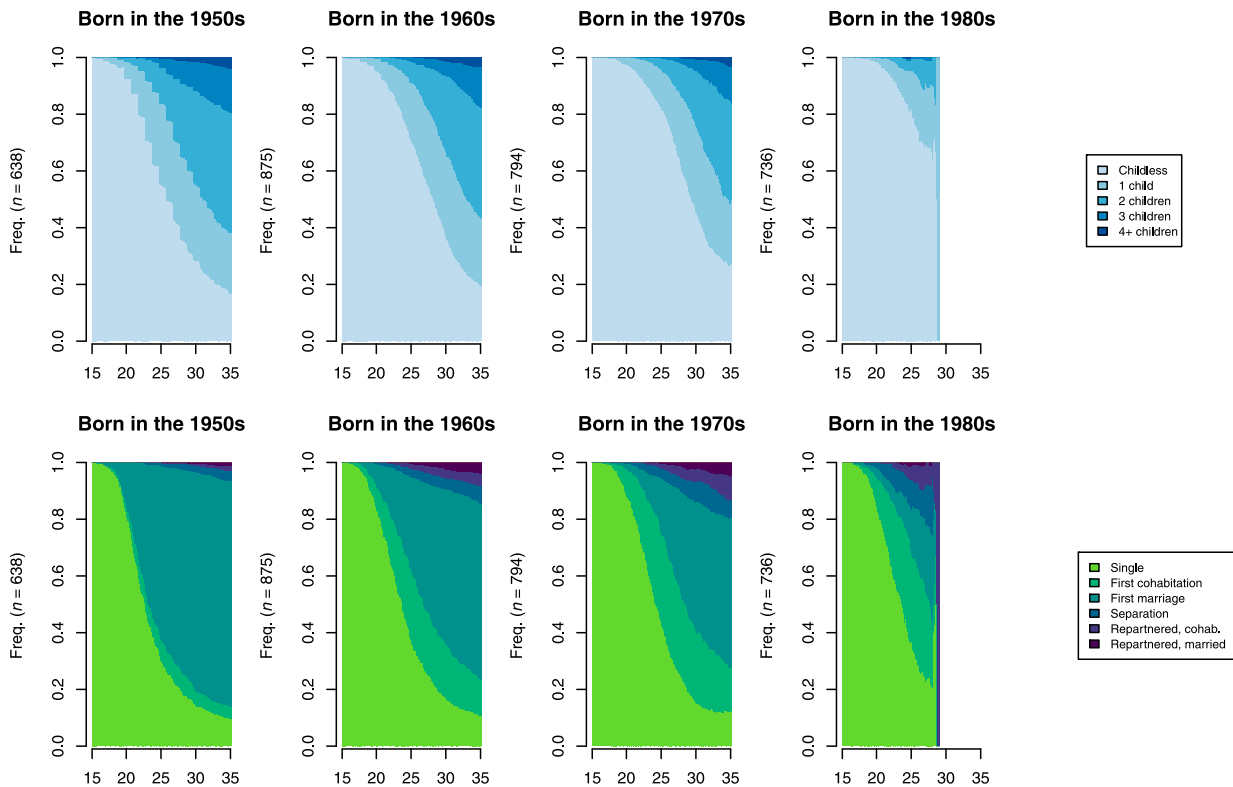


Figure 1 State distribution plots of childbearing and partnership trajectories for all individuals (men and women) from age 15 to age 35, by migrant generation and birth cohort, France

Notes: The chart shows the distribution of states over time by birth cohort separately for: (a) immigrants; (b) descendants of immigrants; and (c) the native French. The upper panels show childbearing trajectories and the lower panels show partnership trajectories. From left to right, the panels represent individuals born in the 1950s (including those born in 1948 and 1949), 1960s, 1970s, and 1980s, respectively.

Source: Trajectories and Origins survey 2008; authors' own calculations.

There are significant differences between immigrants, their descendants, and the native born (Figure 1). In particular, immigrants exhibit more conservative family behaviour compared with descendants and the native French. A large share of immigrants marry early and remain married; they also have more children (Figure 1(a)). By contrast, the native French are more likely to be in a co-residential union, to separate, to repartner, and to exhibit lower fertility levels (Figure 1(c)). The descendants of immigrants display partnership and fertility patterns that are in between those of immigrants and the native born: some experience cohabitation, while some separate and repartner (Figure 1(b)).

The changes over time are similar across population groups: individuals born in the 1950s were the most likely to marry early and to remain married among all three groups. They exhibited higher levels of fertility than individuals from younger cohorts. By contrast, individuals in younger cohorts tended

to enter a non-marital union first and have children at a later stage in the life course. Furthermore, over time, there has been an increase in separation, as well as in the proportion of individuals who repartner. Although these changes have occurred in all three groups, they are more pronounced among the native French than immigrants.

We also evaluated the extent to which the two life domains are related, by calculating the global Cronbach's α following Piccarreta (2017). If α is close to '1', this indicates that individuals who are similar in the childbearing domain are also similar in the partnership domain. In other words, it implies that specific childbearing life courses will be uniquely linked to specific partnership trajectories. By contrast, if α is close to '0', it indicates that individuals with similar childbearing life courses tend to experience a wide range of different partnership situations, that is, there is no systematic (linear) association. Overall, the analysis showed that α was equal to

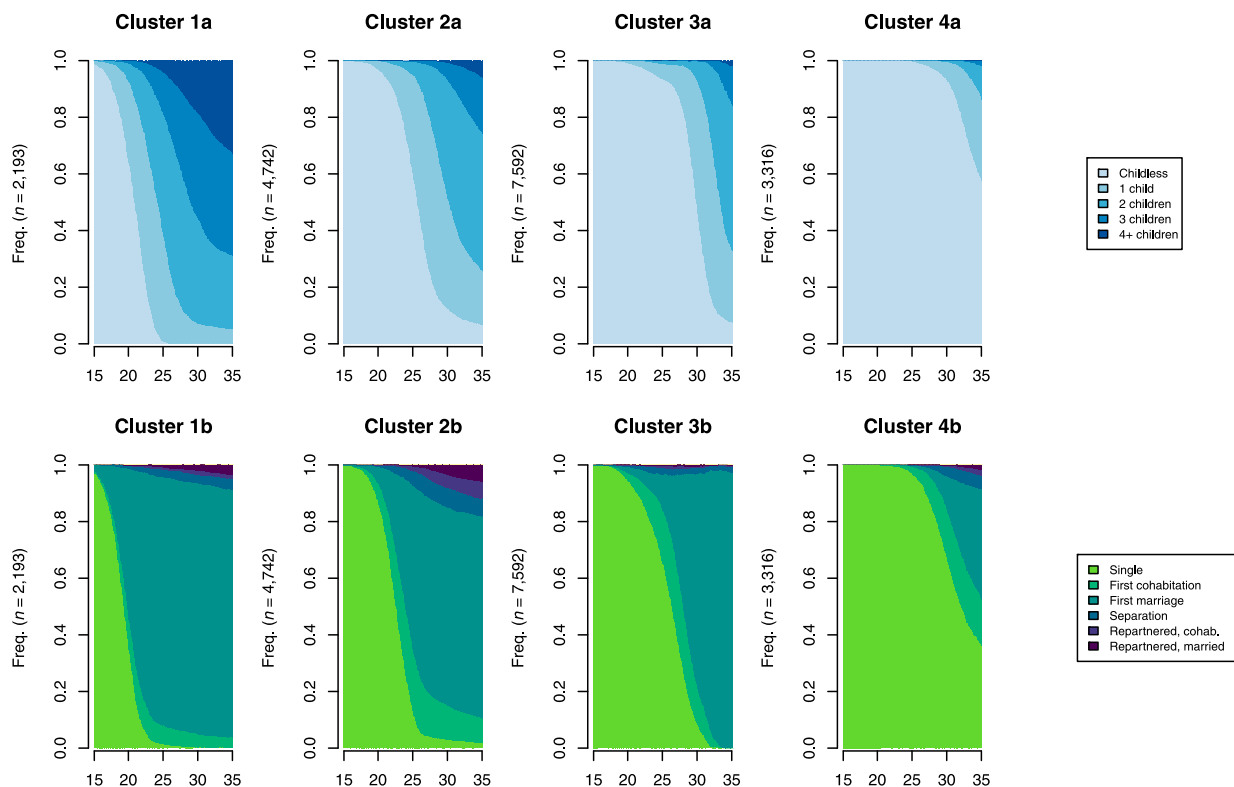


Figure 2 State distribution plots of childbearing and partnership trajectories for individuals from age 15 to age 35 in France: four-cluster solution

Notes: The chart shows the distribution of states over time from age 15 to age 35 for each cluster. The upper panels show childbearing trajectories and the lower panels show partnership trajectories. Cluster 1 represents 12 per cent of the individuals, Cluster 2 represents 27 per cent, Cluster 3 represents 43 per cent, and Cluster 4 represents 19 per cent. These are weighted estimates. This four-cluster solution is based on the optimal matching distance measure, with substitution costs based on transition rates and indel cost of ‘1’ and Ward’s clustering method.

Source: As for Figure 1.

0.65 for immigrants, 0.78 for the descendants of immigrants, and 0.63 for the native French. This suggests that, overall, there is a strong association between childbearing and partnership trajectories in the study population. (We also report the results separately for different population groups in Figure C3, Appendix C, supplementary material.)

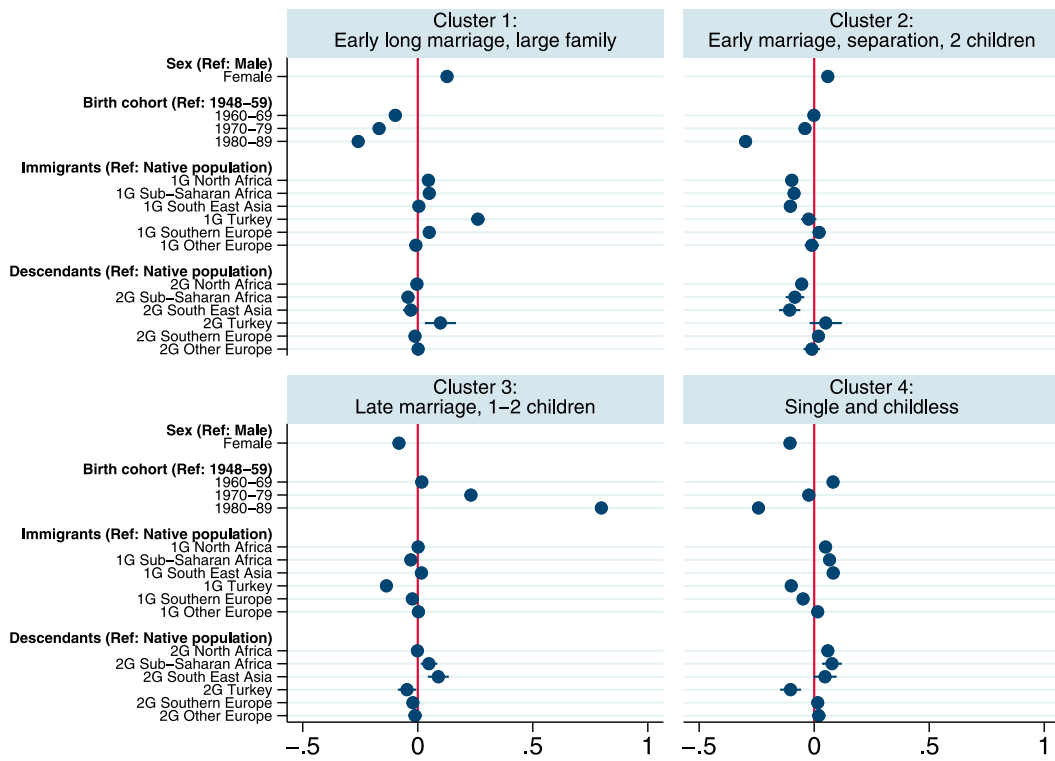
Cluster analysis

To investigate the family trajectories of immigrants and their descendants, we present first the results of cluster analysis and then results from a multinomial logistic regression model to explore to what extent different groups belong to different clusters. As mentioned previously, migrant groups were over-sampled in order to conduct statistically reliable analyses of small groups. Therefore, we used sampling weights in our analysis. This was performed by using the `WeightedCluster` package available in R (Studer 2013).

The results reported in Figure 2 reveal different types of individual family trajectories. The figure shows the distribution of fertility and partnership states as individuals age. As for Figure 1, different colours depict different states. The upper panels (dimension a) represent individuals’ fertility trajectories, while the lower panels (dimension b) illustrate the partnership trajectories. Our observation window is from age 15 to age 35. Each cluster should be described and interpreted by looking at both dimensions.

Cluster 1 (12 per cent of individuals) represents the family life that is the most conservative among the four clusters. It consists of individuals who marry at an early age and remain married. Most have three or more children by their mid-thirties. Cluster 2 (27 per cent) represents a family life where individuals enter into a co-residential union or marriage relatively early. Some experience separation by age 35. The large majority have two children by their mid-thirties. Cluster 3 (43 per cent) is the largest and is composed mostly of individuals who

(a) Showing all covariates of interest



(b) Zooming in on migrant group covariates

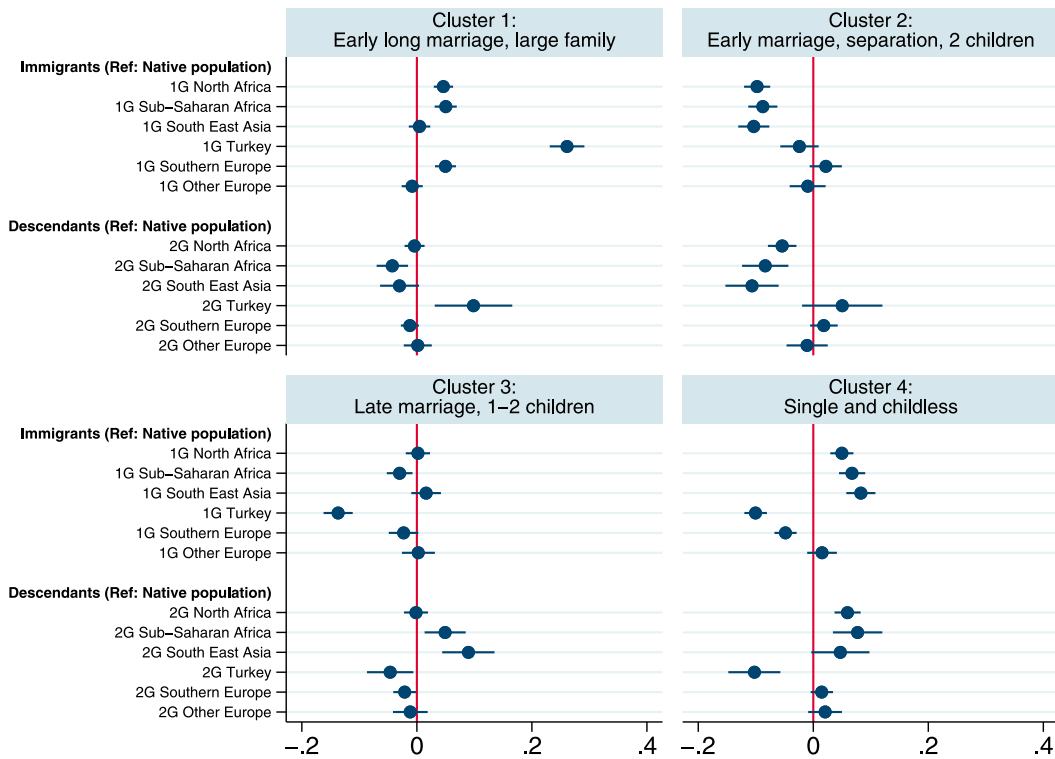


Figure 3 Family dynamics at ages 15–35 and individual characteristics: average marginal effects by cluster, France

Notes: 1G refers to first-generation migrants and shows own country of origin; 2G refers to the second generation (descendants) and shows parental country of origin. The dots represent the average marginal effects and the bars, the 95 per cent confidence intervals.

Source: As for Figure 1.

stay single and childless at the beginning of their twenties. Few individuals experience cohabitation. However, many are married by their late twenties. The majority have one or two children by age 35. Briefly, this cluster is relatively similar to Cluster 2 except that individuals experience partnership and family formation later in their lives and generally do not experience separation. Lastly, Cluster 4 (19 per cent) represents a family life where most individuals remain single and childless until their early thirties. A few experience cohabitation or are married by age 35. However, the large majority remain childless by age 35.

Multivariate results

A multinomial logistic regression model was used to analyse how the family life trajectories are associated with individuals' migrant status and socio-demographic characteristics. [Figure 3](#) presents the average marginal effects. We name the different clusters: Cluster 1 stands for an early and long-standing marriage with a large family; Cluster 2 refers to early marriage and separation with two children; Cluster 3 refers to late marriage with one or two children; and lastly, Cluster 4 stands for single and childless.

The results in [Figure 3\(a\)](#) show that women are more likely to be married with high levels of fertility by age 35 (Cluster 1) compared with their male counterparts. Unsurprisingly, individuals from the most recent cohorts are less likely to experience an early and long-standing marriage compared with older cohorts. The younger cohorts are more likely to be in a later marriage with one or two children (Cluster 3). Immigrants, especially from Turkey, are more likely than the native born to marry early, to remain married, and to have a large family by age 35 (Cluster 1, [Figure 3\(b\)](#)). Compared with the native population, immigrants are much less likely to experience separation (Cluster 2), except for those from Southern European countries.

There are some differences across migrant groups. Interestingly, North African, sub-Saharan African, and South East Asian immigrants are also more likely to be single and childless (Cluster 4) by age 35 compared with the native French population. European immigrants are more likely to follow similar family trajectories to the native population. Among the descendants of immigrants, the children of North African, sub-Saharan African, and South East Asian immigrants are most likely to be single and childless by age 35. By contrast, the children of

Turkish immigrants are significantly more likely to be in an early and long-standing marriage and to have a large family by age 35 (Cluster 1). Lastly, the descendants of Southern and other European immigrants exhibit similar patterns to the native born.

These results largely support our hypotheses. First, immigrants are more likely to follow conservative family trajectories (Hypothesis 1(a)). This is especially the case for Turkish immigrants (Hypothesis 2(a)). Southern European and especially other European immigrants display family trajectories that are closer to those of the native population (Hypothesis 2(b)). Second, the descendants of immigrants exhibit more diverse (and even polarized) family patterns compared with immigrants (Hypothesis 1(b)). The descendants of Turkish immigrants follow family trajectories similar to those of their parents (Hypothesis 2(c)); by contrast, the descendants of European immigrants are close to the native born in their family behaviour (Hypothesis 2(d)).

Conclusion

This paper has examined the fertility and partnership dynamics of immigrants and their descendants over the life course. We used the MCSA technique to examine individuals' fertility and partnership trajectories simultaneously. We applied the novel technique to data from the Trajectories and Origins survey, a rich data set from France. Individuals were grouped into different clusters according to the dissimilarities in their partnership and fertility trajectories. This allowed us to identify the main family trajectories of immigrants and their descendants in France. A multinomial logistic regression model was used to investigate associations between individual socio-demographic characteristics and the obtained clusters.

The results showed important differences in family-related behaviour between immigrants, their descendants, and the native French. There was also considerable heterogeneity in family trajectories across migrant groups. Immigrants were more likely to marry early, to stay married, and to have a large family compared with the native born. This was especially the case for Turkish immigrants. Interestingly, North African, sub-Saharan African, and South East Asian immigrants were also more likely to remain single and childless, suggesting the presence of diversity within these groups. The descendants of immigrants exhibited family patterns that were more similar to those of the native French.

However, there were still significant differences between descendant groups. The children of Turkish immigrants exhibited conservative family trajectories: they were relatively more likely to marry early and have a large family, whereas the descendants of sub-Saharan African and South East Asian immigrants were more likely to be single and childless by age 35. By contrast, the descendants of European immigrants followed patterns similar to those of the native born.

The results confirmed our expectations: overall, immigrants and some descendant groups are more likely than the native born to exhibit conservative family behaviours, where childbearing is mostly associated with marriage. However, there are differences across migrant groups. While high fertility within marriage remains the norm for Turkish immigrants, European immigrants exhibit less conservative family life trajectories. Significant differences across groups also characterize immigrants' descendants. On one hand, the children of Turkish immigrants exhibit fertility and partnership patterns that are similar to those of their parents and different from the behaviour of the native population. On the other hand, the descendants of Southern European immigrants show behaviour similar to that of the native population.

These results remained even after controlling for other factors that could explain the family behaviour of immigrants and their descendants (additional analysis not reported). For instance, individuals who migrate for family reunification often exhibit different family trajectories from those who move for employment reasons. However, after controlling for migration motives, the results did not change significantly. Similarly, family background is likely to matter for the descendants of immigrants: having two immigrant parents (rather than only one) influences their family behaviour of the descendants. The differences between descendant groups remained even after controlling for family background. Similar results were also found after controlling for the number of siblings and level of religiosity. Lastly, an important issue to explore is whether there are differences between men and women. The results obtained from the multinomial logistic regression model indicated that women follow slightly more conservative family pathways than men, and these patterns are also likely to vary by migrant group.

Overall, the study findings are consistent with the increasing diversity of family forms in France and the view that immigrants contribute to existing heterogeneity. There are groups who follow conservative family formation pathways (where

childbearing is mostly associated with marriage) and there are groups who experience non-marital childbearing, separation, and two or more unions. Our results seem to support the theory that socialization factors still play an important role in the partnership pathways of immigrants, especially in the type of union (marriage vs cohabitation) and union outcomes (e.g. separation or childbearing). This suggests that cultural and normative factors are important determinants of family trajectories, although they do not necessarily undermine the role of resources. The family pathways of the descendants of immigrants are in between those of immigrants and the native population. For those groups for whom the differences between immigrants and the native born are small, the family patterns of descendants have become indistinguishable from those of the native French, whereas for others, especially those whose parents came from countries with conservative family forms, they still resemble the patterns of immigrants. The results thus suggest that the mainstream society has shaped family trajectories for all descendant groups, but for some groups minority subculture has also played an important role. Nevertheless, we can expect the differences between the native French and descendants of immigrants to be even smaller in the next generation, although some diversity of family forms is still expected to persist within French society.

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- 1 Isaure Delaporte and Hill Kulu are both based in the School of Geography and Sustainable Development, University of St Andrews. Please direct all correspondence to Isaure Delaporte, School of Geography and Sustainable Development, University of St Andrews, KY16 9AJ; or by Email: icmd1@st-andrews.ac.uk
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ORCID

Isaure Delaporte  <http://orcid.org/0000-0003-0279-2032>

Hill Kulu  <http://orcid.org/0000-0001-8808-0719>

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