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Article

Divergent mortality patterns for second generation men of North-African and South-European origin in France: Role of labour force participation

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ABSTRACT

Introduction: In France, second generation men of South-European origin were recently found to experience a mortality advantage, as opposed to second generation men of North-African origin, subjected to a large amount of excess mortality. We analyze the roles of education and labor force participation in the explanation of these contrasting mortality patterns.

Materials and methods: Our data consisted of a nationally-representative sample of individuals aged 18–64 years derived from the 1999 census, with mortality follow-up until 2010.

Results: The two groups of second generation men, and particularly those of North-African origin, were less educated than the native-origin population, but only the latter was disadvantaged in terms of labor force participation. Relative to the native-origin population, the mortality hazard ratio for second generation men of North-African origin (HR = 1.71 [1.09–2.70]) remained significant after adjusting for level of educational attainment (HR = 1.59 [1.01–2.50]), but not after adjusting for economic activity (HR = 1.20 [0.76–1.89]) or for both variables (1.16 [0.74–1.83]). Conversely, the mortality hazard ratio for second generation men of South-European origin (HR = 0.64 [0.46–0.90]) remained unchanged after adjustment for level of educational attainment and/or economic activity.

Conclusion: The findings shed light on the salient role of labor market disadvantage in the explanation of the mortality excess of second generation men of North-African origin in France, and on the favorable situation of second-generation men of South-European origin in terms of labour market position and mortality. The theoretical and policy implications of the findings are discussed.

Introduction

The situation and life outcomes of the native-born children of immigrants represent a critical question in many countries of Western Europe, where they constitute a growing share of the young and adult populations (6.0% of the total EU population in 2014 (Agafitei & Ivan, 2018)). At a time when large numbers of these so-called 'second generation' are either finishing their educational pathways or fully involved in the labour market, how they fare across life may be interpreted as reflecting the success or not of the integration process (Lessard-Phillips, Galandini, de Valk, & Fibbi, 2015). Such success is usually measured in terms of decreasing differences between immigrant-origin and native-origin populations using outcomes like educational attainment, labour market performance and social inclusion.

In this framework, health is also important to consider, both as a determinant and an outcome. Indeed, good health is in itself a prerequisite for reaching the political goal of integration in the sense of full and unrestricted participation in the host society. At the same time, health is an outcome affected by other dimensions of the integration process. There are multiple dimensions to health, and mortality is commonly used as a summary indicator for studying health. First-generation migrants have long been known to experience a mortality advantage, attributable in large part to in-migration selective forces (Guillot, Khlat, Elo, Solignac, & Wallace, 2018). Unlike their parents, second generation individuals are not directly subject to selection forces, and therefore their mortality patterns are likely to be less favorable.

Indeed, second generation immigrant men (but not women) were shown to have worse self-rated health than similarly aged native-born individuals with native-born parents and than recent immigrants, based

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on the pooling of data from fourteen Western European countries (La Parra-Casado, Stornes, & Solheim, 2017). Little is known however about their mortality. This may in part be related to the difficulties in identifying the children of immigrants in official statistical sources (Lessard-Phillips et al., 2015). Furthermore, explorations of second generation mortality require countries in which the migration history is long enough, and diverse enough, for the first-generation to have arrived, settled and established a substantial pool of second generation.

The few existing studies for European countries reveal a pattern of mortality disadvantage for the second generation, in direct contrast with the "healthy migrant effect" characteristic of the first-generation. To date, this has been documented for specific second generations groups from Switzerland (Tarnutzer, Bopp, & group, 2012), Sweden (Manhica, Toivanen, Hjern, & Rostila, 2015), Belgium (De Grande, Vandenheede, Gadeyne, & Deboosere, 2014; Vandenheede, Willaert, De Grande, Simoens, & Vanroelen, 2015), England and Wales (Wallace, 2016), and France (Guillot, Khlat, & Wallace, 2019).

In most of the above literature, adjusted relative estimates of mortality were used to assess the position of children with immigrant parentage net of the influence of socio-economic background, with little attention given to the independent roles of the different confounders included in the analyses. However, these confounders deserve scrutiny, as socioeconomic factors have been shown in certain contexts to have distinctive effects on the mortality of individuals with a foreign background. In the French study, mentioned above as one of only a handful to have studied second generation mortality in Europe (Guillot et al., 2019), the authors drew attention to the sharp contrast between the disadvantaged mortality situation of second generation men of North African origin in comparison to natives and the advantaged mortality situation of second generation men of South-European origin. This was all the more striking as the first-generation of North African and South European men both experienced a 'migrant mortality advantage' of a similar magnitude relative to natives. All of the above differences persisted after adjusting for the level of educational attainment.

Building on this study, we develop an in-depth exploration of the situation of these second generation men and the role of education and labor force participation in the explanation of their sizeable mortality differentials in comparison with the natives. There are many reasons for choosing these two factors. First, educational attainment is both strongly related to health and mortality and one of the most influential determinants of employment prospects (Meurs, Pailhé, & Simon, 2006). Second, the labour market is considered an important arena with respect to health differences between natives and immigrant groups (La Parra-Casado et al., 2017). In turn, exclusion from the labor market, which is a frequent occurrence for some groups of second generation men, is known to be associated with negative health outcomes (Brown et al., 2012). Focusing on these two dimensions and analyzing them together will thus offer greater insight into understanding the profiles and determinants of mortality of second generation men.

Our data consist of a large representative sample derived from the 1999 Census and a 1999 Family Survey with mortality follow-up until 2010. We analyze group profiles with respect to educational attainment and labor force participation and investigate the role of each one in the explanation of the mortality differentials. The findings are interpreted in the light of the sociological literature on the integration of second generations in France (and other countries), the socio-epidemiological literature on the mortality of the unemployed and inactive, and the demographic literature on young adult mortality.

Background: immigrants and their direct descendants in France

In Europe, France stands out as the oldest country of immigration. The earlier migration flows involved migrants from European countries (Italy, Spain, Portugal, Belgium, Poland), followed after 1945 by large waves of "colonial" migrants (mostly of North-African origin) during the economic boom of the 1950s and 1960s. In spite of a decrease in labor migration after 1973, immigration to France continued, mostly via family reunification, and the diversity of migrants continued to increase, with larger proportions of migrants from Sub-Saharan Africa and Asia. The creation of the borderless Schengen area in 1995 and the EU expansion in 2004–07 also led to increases in immigration from other EU countries. In 2010, the proportion of foreign-born individuals in France's population was 10.7%, a level similar to those found in the US and large European countries such as Germany or the UK. The two most important regions of origin of France's foreign-born population were North Africa and South Europe (with 30.4% and 21.5% of the total foreign-born population, respectively) (INSEE, 2012).

France also stands out for the size of the second generation, i.e., native-born children of immigrants. In 2010, native-born individuals with a least one foreign-born parent represented 10.4% of the population (INSEE, 2012). European comparisons focusing on the age group 25–54 show that France is the country where the proportion of second-generation individuals is the highest (13.5% in 2008) among large (population > 2M) EU 27 countries (European Commission, 2011). In total, more than one resident out of four (26.6%) in the 25–54 age group are either foreign-born or native-born with at least one foreign-born parent. After removing the returning members of the colonizing population from the foreign-born population and their children from the second generation, the proportions were 8.9% for immigrants properly speaking in 2014 (i.e. 5.9 million born abroad with a foreign nationality at birth, which is the official definition of an immigrant in France) (Brutel, 2015) and 11% for direct descendants of immigrants in 2012 (i.e. 6.8 million born in France from at least one immigrant parent) (DSED, 2014). In 2008, the countries of origin most represented among immigrants were Algeria, Morocco and Portugal, and the parental countries of origin most represented among direct descendants were in South Europe (Portugal, Italy or Spain) and North Africa (Algeria, Morocco or Tunisia), with each region totalling about one third. The last third comprises a very diverse set of parental countries of origin, including countries in Sub-Saharan Africa, Europe and Asia (INSEE, 2012).

Data and methods

Data

Our analyses were based upon the Echantillon Longitudinal de Mortalité data (ELM; the Longitudinal Mortality Sample), an individual-level and longitudinal sample of people living in France (including the overseas territories) in 1999 with mortality follow-up to 2010. Specifically, the ELM combines three data sources: demographic and socio-economic information from the 1999 Census, detailed family histories from the Etude de l'Histoire Familiale (EHF) – a supplementary survey which was administered to a random sample of 380,000 individuals along with the 1999 Census forms – and death records from the French national civil registers. The three data sources were linked based upon the name, date of birth and place of birth of individuals. The ELM data are attractive because of the additional information provided by the EHF survey that helps to accurately identify the second-generation (G2). Our comparison of age-specific mortality rates from the ELM data with official life tables for 1999–2010 showed that mortality in the ELM data was representative of national mortality in France.

Defining the G2s and other explanatory covariates

To identify G2 individuals, we used four pieces of information: (i) the country of birth of the respondent (1999 Census); (ii) the country of birth of the parents of the respondent (EHF); (iii) the language spoken by the parents of the respondent when the latter was aged 5 (EHF), and; (iv) the nationality at birth of the respondent (1999 Census). Initially, we defined the following groups: **reference population** (those

individuals born in metropolitan France to two parents born in metropolitan France), **G2s of South-European origin** (those individuals born in metropolitan France to two parents born in any of Spain, Italy or Portugal), and **G2s of North-African origin** (those individuals born in metropolitan France to two parents born in any of Algeria, Morocco or Tunisia).

The next step of the process involved the **G2s of North-African origin** only, taking into account the complex migration history between this region and France. In short, Algeria, Morocco and Tunisia were French colonies and/or protectorates from the early-19th Century to mid-20th century. During this period of French rule, many Europeans (predominantly French) settled in North Africa and had children there; these children were known as the *Pied Noirs*. We made use of the two other variables specified above to separate the G2s *Pied Noirs* from the G2s of North-African origin.

Primarily, we used the language spoken by parents to the respondent at age 5 years. This is based on the premise that *Pied Noirs* were unlikely to have spoken to their children in any language other than French, whereas immigrants from North Africa were equally unlikely to have spoken to their children in French only. Therefore, we only include children of immigrants born in France to two parents born in North Africa, whose parents spoke some Arabic or Berber to them during childhood. Then, of the remaining individuals born in France to two parents born in North Africa whose parents *did* speak to them exclusively in French, we included those who specified their nationality as "foreign" or "French by acquisition". Following this extended definition, the only group we might have missed are those G2s of North-African origin who had declared a French nationality at birth and whose parents spoke to them exclusively in French during childhood. According to recent research, this group comprise only a small minority (Condon & Regnard, 2018).

In addition to our subpopulations of interest, we also adjusted for age (specified and cross-verified in the EHF and the census), level of educational attainment and economic activity status which were both measured at baseline in the 1999 Census. Concerning education, the variable which we used was the level of the highest qualification attained. For instance, those having left education during the course of lower secondary education, before completing the final year and obtaining the "Brevet des collèges" were categorized as having a "primary level" of educational attainment. We coded those levels into three categories following the International Standard Classification of Education (ISCED): *primary*; *secondary* (secondary first and second cycle); and *tertiary* (post-secondary to pre-university and beyond). For economic activity status, the categories available were: *employed*, *unemployed*, *student* (students and unpaid interns), *retired* (early retired, retired, independent retired) and *other inactive*. The employed and unemployed categories constitute the active population, whereas the students, retired and other inactive together constitute the inactive population. The category "inactive other than student or retired" comprised men who were looking after home and family, those who were permanently sick and those who were neither part of the labor force nor involved in any training or study programme. At younger ages, the latter are bound to represent the bulk of this category.

Study parameters

We followed individuals aged 18–65 from March 1999 to April 2010. The lower age limit of 18 years is a feature of survey design, as the family survey was distributed only to those aged 18 + years on January 1st, 1999. The upper age limit of 65 years was determined by the population age structures of our subpopulation, as there were hardly any G2s (particularly of North-African origin) above age 65 (see Table 1). Individuals who reached age 65 during the follow-up period were right-censored at that age, even if they later died during the study period (say, at age 70). We focused exclusively on males because divergent mortality trajectories over generations were not observed among females (Guillot et al., 2019). Foreign-born individuals, as well as individuals born in the French overseas territories and their descendants were also excluded. The working sample was around 85,700 males with 3,000 deaths.

Table 1
Baseline characteristics of population subgroups. France, 1999–2010, Men, Echantillon Longitudinal de Mortalité (ELM).

	Reference population	G2s of South-European origin	G2s of North-African origin
Deaths [from 18 to 64.99 years]	2729	34	19
Population [total N = 90,011] [1]	70,509	1628	710
%	*92,6*	*2,1*	*1,0*
Percentage distribution of age			
18–24	12,7	16,0	43,4
25–34	23,9	31,3	36,9
35–44	24,8	22,2	16,2
45–54	23,1	17,1	2,8
55–64	15,5	13,3	0,7
Percent with primary level of educational attainment(ISCED)			
18–34 years	10,7	14,9	22,6
35–44 years	16,2	20,4	25,2
45–64 years	29,7	33,7	36,0
Percentage distribution of economic activity status			
18-24 years			
Employed	45.3	55.2	26.6
Unemployed	12.1	13.8	24.7
Student	41.1	29.9	47.7
Retired	/	/	/
Other inactive	1.5	1.2	1.0
25-34 years			
Employed	89.3	87.0	63.0
Unemployed	8.2	10.6	32.8
Student	1.4	1.4	1.5
Retired	/	/	/
Other inactive	1.0	1.0	2.7
35-44 years			
Employed	91.9	93.9	62.6
Unemployed	6.0	5.0	30.4
Student	0.2	0.3	/
Retired	/	/	/
Other inactive	1.9	0.8	7.0
45-64 years			
Employed	65.2	61.9	56.0
Unemployed	5.4	4.8	28.0
Student	/	/	/
Retired	25.2	30.0	8.0
Other inactive	4.2	3.2	8.0

Note: (1) risk population excludes individuals with missing values in educational level (2.1% reference; 3.8% North-African; 2.1% South-European) and economic activity (3.0% reference; 3.5% North-African; 3.1% South-European).

Certain individuals had also to be excluded for reasons external to the study design. Some could not be matched to the civil register data: those represented 9.1% of the reference population, 17.2% of the G2s of South-European origin and 24.5% of the G2s of North-African origin. Our analyses showed that individuals with low education and unemployed individuals were more likely to be unmatched. We also chose to exclude individuals with missing values for level of educational attainment (1600; 2.1%) and economic activity status (2300; 3.0%). While mortality is higher among these individuals, the rates of missingness did not vary over our subpopulations (see Table 1 footnote). These additional exclusions left us with a final sample of 72,847 males and 2,782 deaths.

Methods

The initial descriptive table includes the population sizes, number of deaths, age composition and distributions of level of educational attainment and economic activity status (Table 1).

Table 2
Logistic regression models: odds ratio for "primary level of educational attainment", "unemployed" and "inactive other than student or retired" for population subgroups. France, 1999–2010. Men, Echantillon Longitudinal de Mortalité (ELM).

Outcome	Reference population	G2s of South-European origin		G2s of North-African origin	
	OR	OR	95% CI	OR	95% CI
"Primary level of educational attainment"					
Age-adjusted odds ratios	**1**	1.48**	1.29–1.69	1.92**	1.55–2.37
"Unemployed" in the active population					
Age-adjusted odds ratio (1)	**1**	1.06	0.88–1.28	4.99**	4.16–5.99
Age and education-adjusted odds ratios	**1**	0.99	0.82–1.20	4.47**	3.71–5.38
"Inactive other than student or retired" in the total population					
Age-adjusted odds ratio (2)	**1**	0.71	0.48–1.04	1.90**	1.21–2.98
Age and education-adjusted odds ratios	**1**	0.66**	0.45–0.97	1.59*	1.01–2.51

Notes: (1) odds of being unemployed relative to employed; (2) odds of being "inactive other than student or retired" relative to all other categories.
$P < 0.01$ **; $p < 0.05$*.

Next, to better characterize the second generation integration in terms of educational achievements and labor force participation, we estimated several logit models within the three population subgroups, using, in turn, "primary level of educational attainment", "unemployed", and "inactive other than student or retired" as the binary outcomes. Initially, we fitted baseline models which adjusted for age differences. For "unemployed" and "inactive other than retired or student", we added level of educational attainment in a second step (Table 2).

For our analysis of mortality, we fitted survival (or event history) models to study all-cause mortality in the population subgroups, with age as the timescale (Table 3). The basic model can be specified as follows:

$$\mu_X(t) = \mu_0(t) \times exp\left\{\sum_{i=1}^{k} \beta_i X_i\right\},$$

where $\mu_X(\boldsymbol{t})$ denotes the hazard (or the 'force') of mortality at age $\boldsymbol{t}$ for an individual with covariate vector $X = (X_1, \ldots, X_k)$ and $\mu_0(\boldsymbol{t})$ denotes the baseline hazard, i.e. the mortality risk by age, which we assume to follow a Gompertz distribution. Individuals are considered "at risk" from the date of the 1999 Census (8th March 1999) and are followed until age at death, or age at the end of study period (15th April 2010), with a right-censoring at age 65. $\boldsymbol{\beta_i}$ represents the parameter estimate for covariate X_i.

We fitted a series of nested models to investigate mortality differentials across population subgroups. The baseline model adjusted for the population subgroups only to investigate whether any initial mortality differences existed between the reference population, G2s of South-European origin and G2s of North–African origin. The second model adjusted for population subgroup and level of educational attainment; the third model adjusted for population subgroup and economic activity status. The final model adjusted for level of educational attainment *and* economic activity status to determine the combined effect of simultaneously adjusting for both of these variables on differential mortality.

Results

Description of background characteristics

The socio-demographic profiles of the subpopulations of interest are described in Table 1. The two second-generation groups were both younger than the reference population but had very different age distributions. Whereas about 70% of the G2s of South-European origin were aged less than 45 years at start of study, the overwhelming majority of the G2s of North-African origin fell in this age range (97%). These contrasting age profiles reflect the chronology of the migration flows of the respective first-generations to France, with an earlier arrival of South Europeans relative to North Africans.

Both groups were less educated than the reference population, with a greater gap for those of North-African origin, particularly in the younger age groups. Indeed, between ages 18 and 34 years, the

Table 3
Parametric survival models: mortality hazard ratios (ages 18–64) for population subgroups, France, 1999–2010, Men.

	Baseline model		Baseline + educational level		Baseline + economic activity		Baseline +education +economic activity	
	HR	95% CI	HR	95% CI	HR	95% CI	HR	95% CI
Population subgroup								
Reference	**1**		**1**		**1**		**1**	
G2s of South-European origin	0.64*	0.46–0.90	0.62**	0.44–0.87	0.65**	0 .46–0.91	0.63**	0.45–0.89
G2s of North-African origin	1.71**	1.09–2.70	1.59*	1.01–2.50	1.20	0.76–1.89	1.16	0.74–1.83
Educational level (ISCED)								
Tertiary	Not adjusted		1		Not adjusted		1	
Secondary			1.68**	1.49–1.89			1.52**	1.35–1.71
Primary			2.34**	2.06–2.67			1.93**	1.69–2.20
Economic activity status								
Employed	Not adjusted		Not adjusted		1		1	
Unemployed					2.85**	2.55–3.18	2.67**	2.39–2.99
Student					1.11	0.77–1.61	1.15	0.79–1.66
Retired					1.55**	1.36–1.76	1.43**	1.26–1.62
Inactive other than student or retired					4.56**	4.05–5.13	4.16**	3.69–4.69

$P < 0.01$ **; $p < 0.05$.

proportion of those with only a primary level of educational attainment in the G2s of North-African origin was more than twice that of the reference population. In terms of labor force participation, G2s of North-African origin were disadvantaged compared to the reference population, with higher proportions of individuals in the" inactive other than student or retired" category and particularly of unemployed. Whereas the proportion of unemployed tended to be lower at older ages, G2s of North-African origin were the only group with large proportions of unemployed above 35 years (keeping in mind that those figures were based on very small numbers). G2s of South-European origin were better off, in that their proportions of unemployed did not differ from those of the reference population and in that they even had lower proportions for the "inactive other than student or retired" category.

Analyses of group differences in level of educational attainment and in labor force participation

The logistic regression models provided summary measures of the differences relative to the reference population in terms of educational achievement and labor force participation, two key measures of integration (Table 2). Both G2s of South-European origin and, particularly, G2s of North-African origin had higher odds of having only a primary level of educational attainment. Importantly, however, while G2s of North-African origin had markedly higher odds of unemployment that persisted after adjusting for level of educational attainment, G2s of South-European origin had ORs that reflected the reference population. For inactivity, G2s of South-European origin had even lower odds than the reference population after considering education, while G2s of North-African origin had higher odds of inactivity (though not to the same extent as unemployment), which remained marginally significant after adjusting on education.

Mortality differentials

Before taking level of educational attainment and economic activity into consideration, the mortality hazard ratios (HRs) compared each G2 group with the reference population of individuals born in France to two parents born in France (Table 3). These HRs had wide confidence levels, due to small sample sizes. Nonetheless, a striking contrast emerged between the significant mortality disadvantage of the G2s of North-African origin and the significant mortality advantage of the G2s of South-European origin. After adjusting for level of educational attainment, the estimate for the G2s of North-African origin decreased somewhat but remained high and significant. This suggests that the mortality disadvantage which the G2s of North-African origin experience (Guillot et al., 2019) is not only a reflection of their disadvantaged educational profiles. Controlling for level of educational attainment had little impact on the mortality advantage of the G2s of South-European origin, although a strengthening of the advantage would have been expected as they tend to be less educated than the reference population. After adjustment on age and economic activity status, the hazard ratio for the G2s of North-African origin substantially declined and was no longer statistically significant. Again, there was little impact on the estimate for the G2s of South-European origin. The estimates provided by the third model including both variables were very similar to those produced by the second model.

Discussion

Among populations with a migrant background, the relative educational achievements of the second generation complemented by their labor force participation in the host society are considered as "robust measures of group integration" (Crul, Schneider, & Lelie, 2012). We analyzed the roles of these two essential socio-demographic factors in the explanation of the mortality risks of the two largest groups of second generation men in France.

The initial observation was that of a mortality advantage for the G2s of South-European origin, and at the opposite of a mortality disadvantage for the G2s of North-African origin. Further to that, both groups were found to have a somewhat similar educational gap. However, they had a completely different labour market situation, as the G2s of North-African origin were specifically concerned by unemployment and inactivity, even after adjustment for level of educational attainment. By dealing with this compositional effect, adjustment on both level of educational attainment and economic activity status eliminated the differential mortality of the G2s of North-African origin. The role of economic activity seemed to be at the forefront, as adjusting on it alone did the same, whereas level of educational attainment only explained a little part of the excess mortality of the G2s of North-African origin. In contrast, the persistence for the G2s of South-European origin of the type of mortality advantage traditionally observed in first generation migrants suggests that they benefit from specific protective factors.

Studies in other contexts have reported a limited explanatory power for education as opposed to more economic indicators. In Sweden, the high mortality rates in male offspring of immigrants was found to be associated with economic, but not educational disadvantage (Manhica et al., 2015). In another study from the same country, socioeconomic position, and especially income and occupational class, accounted for most of the mortality differentials by country of birth (Rostila & Fritzell, 2014). Second generation immigrants of Moroccan origin in Belgium had a mortality disadvantage similar to what we find for G2s of North-African origin, which only disappeared after control for socioeconomic position (Vandenheede et al., 2015). In Switzerland, the second generations were found to enjoy a mortality advantage similar to the first generation, except when they were inactive (Zufferey, 2016). In this country, second generation Italian and Spanish immigrants were shown to be more successful at school and in the workplace than children of Swiss manual workers, possibly because of family culture and support (Bolzman, Fibbi, & Vial, 2003).

Regardless of origin, not having a definite activity at entry into adulthood is strongly related to health. In France, "young people not in employment, education or training (NEETs)" were shown to have poorer health than the general population, coupled with limited health insurance, low levels of education and social isolation (Robert, Lesieur, Kergoat, Dutertre, & Chauvin, 2015). In our sample, 13.6% of young men aged 18–24 years in the reference population, versus 15% among the G2s of South-European origin and as high as 25.7% of the G2s of North-African origin belonged to the NEETs subcategory. In the European Union, 23.4% of young people aged 16–24 years fall under this heading (Mawn et al., 2017). In the United Kingdom, Michael Marmot has warned about the public health consequences of persistent high levels of young people over 18 not in employment, education or training (Marmot, 2014).

Furthermore, the specific relevance of labour force participation for second generations is emphasized by studies in different contexts. In Switzerland, the specific vulnerability of the second generations in a situation of inactivity has been related to the fact that they do not benefit from the selection effects experienced by the first-generation, which confers protection against disability or disease (Zufferey, 2016). Consistent findings were reported in Sweden, with the employed second generation men showing a mortality advantage relative to the employed native-origin men, in sharp contrast with the mortality disadvantage affecting the unemployed second generation men (Dunlavy, Juarez, & Rostila, 2018).

Another interesting perspective for the interpretation of the excess mortality of the G2s of North-African origin is that of the young adult mortality hump, present in many populations around the world. The role of stress experienced when transitioning to adult life has been suggested and the underlying causes of death have been shown to be suicides, homicides and poisonings (Remund, Camarda, & Riffe, 2018). A study in Switzerland has demonstrated that unemployment is

associated among the 15–35 years old with a doubling of the probability of dying and having a non-European origin with a 50% rise (Remund, 2018).

Sociological research on the integration of immigrants in France has greatly expanded following the 2005 and 2006 riots of young immigrants in the Paris suburbs. In terms of education, almost all groups of second generations were found to have lower gaps relative to children of native-born than first-generation immigrants, most of whom had limited education, compared to the native-born (Algan, Dustmann, Glitz, & Manning, 2010). However, some groups did not reap the benefits on the labour market of their educational progression as they seemed to be doing even worse than the first generation (Algan et al., 2010). In comparison with the majority population, transition to first employment was particularly difficult and long for children of immigrants, and, after adjustment for education and contextual effects, individuals of North African descent were found to be those who suffered the most (Brinbaum, Meurs, & Primon, 2015). While G2s of South-European origin were shown to be relatively unaffected by unemployment, G2s of North African, sub-Saharan African and Turkish origins stood out as being particularly exposed to unemployment and unstable jobs (Calvès, 2005; Canaméro, Canceill, & Cloarec, 2000; Fougère & Pouget, 2004; Silberman & Fournier, 1999) and extremely vulnerable (Meurs et al., 2006). Studies of discrimination in access to employment in France have revealed that discrimination against minority applicants was very strong (Cediey & Foroni, 2008) and that higher studies hardly compensated for a foreign origin (Ene-Jones, 2013). Furthermore, a situation of persistent downgrading has been pinpointed in France, particularly for populations "from zones formerly under colonial domination" (Silbermann & Fournier, 2008), i.e. mainly from North Africa.

All findings combine to create a picture of hardship in the workplace, exclusion from the labour market and negative assimilation among certain second-generation subpopulations. These disadvantages are consistent with survey information available on perceived discrimination, as immigrants from North Africa and their direct descendants were precisely among those who were most likely to declare being subjected to unfair treatment in the workplace (Silbermann & Fournier, 2008). As mentioned earlier, the chronic pressure resulting from perceived discrimination is likely to lead to ill-health (Karlsen, 2002), possibly through the adoption of detrimental behaviours, and may therefore play a role in the large mortality disadvantage of second generation men of North-African origin.

Limitations

Given the absence of information on health at start of follow-up, causation cannot be directly addressed. Reverse causation would be operating if the labour market marginalisation of men of North-African origin were the result of poorer health, rather than the other way around. However, this is unlikely to occur in the youngest age groups covered by the study, and there is in the literature a large body of evidence on the adverse health repercussions of unemployment and inactivity in early and mid-adulthood.

Another issue is that the analyses are based on labor force participation at the start of the study, without any update during the 11-year follow-up period, while in fact we are dealing with a time-varying process, with individuals shifting across categories over time. Our findings are all the more impressive, as changes during the course of follow-up are bound to blur exposure groups boundaries and obscure differences rather than generate artificial ones. Regarding the transient nature of unemployment, some studies have demonstrated that the experience of joblessness has long-term effects on income and referred to an unemployment "scar" (Arulampalam, 2001). This type of "scar" could contribute to negative pathways, particularly because "unemployment spells do not happen at random, but tend to take place as part of a generally disadvantaged life course" (Bartley & Ferrie, 2010).

As indicated in the Methods part, there were lower proportions of individuals matched to the civil register among the G2s of North-African origin than among either the G2s of South-European origin or the reference category. Our finding that unmatching is more likely for individuals from lower socio-economic categories suggests a downward bias in the mortality estimates based on matched individuals. Given the lower proportions matched among G2s of North-African origin by comparison with the reference category, the downward bias is likely to be larger for this group. In order to provide further evidence, we have compared the education distributions for all individuals (whether matched or unmatched to the register) vs. the education distributions for matched individuals only, i.e., those on the basis of whom mortality hazard ratios are estimated. For the reference population and G2s of South-European origin, there is little distortion in educational distribution for the matched sample vs. the entire EHF sample. For the G2s of North-African origin, however, the matched sample is substantially distorted toward higher education categories. This pattern suggests that the excess mortality we find for second-generation North African-origin males underestimates the true amount of excess mortality for this group.

The last limitation concerns the sample size, as the findings are based on only 34 deaths for second generations of South-European origin and on 19 deaths for those of North-African origin, albeit among populations of 1628 and 710 respectively. Although the differences are highly significant and have internal and external validity, they need to be replicated with other data sources. This also meant that we could not explore the second generation to the fullest extent of their heterogeneity (i.e. other origin groups or differences within the two groups). Another difficulty hindering generalization is the lack of proper sample weights, although we checked that unweighted mortality estimates for the entire ELM sample were very close to estimates from official life tables for the same period.

Conclusion

Our analyses reveal the central role of labor force participation in the explanation for the mortality differentials under study and uncover distinct and specific mortality patterns, previously hidden from view. These findings have implications for policy and also carry significant theoretical insights. Regarding policy, the integration of second generation individuals, especially those of North-African origin, has been attracting considerable attention in France lately. The prominent role played by labor force participation in explaining the substantial mortality disadvantage of the second generation men of North-African origin suggests strong efforts should be made to lift barriers and facilitate integration in the labour market. In this respect, in its 2017 country-specific recommendations for France (European Commission, 2017), the Council of the European Union pointed out that second generation men "face adverse employment outcomes that are not explained by differences in age, education and skills" and that they were only partially narrowing gaps in education. The Council recommended "action against discriminatory practices affecting the hiring of non-EU born and second generation men."

On theoretical grounds, our findings have relevance with regard to the general issue of whether the healthy migrant selection effect persists in the second generation. The group of second generation men of South-European origin constitutes an example of successful integration, as they seem to benefit fully from a considerable mortality advantage, similar or even more pronounced than that enjoyed by the first generation. In Switzerland, the favorable situation of Italian and Spanish immigrants has been related to psychosocial factors and "a family culture of effort in migrant families that encourages the success of their young members" (Zufferey, 2016). Continuing along those lines, investigating the specific factors underlying this exceptionally favorable situation is a promising avenue for future research.

In conclusion, this study sheds light on the divergent life paths of

two groups of men born in France from a prior generation of selected healthy immigrants. The findings illustrate the extent to which successful integration in the job market is accompanied by the persistence across generations of the longevity advantage, whereas unsuccessful integration is not only accompanied by a loss of the advantage, but by its reversal.

Ethical approval

Institutional Review Board of the University of Pennsylvania. Protocol number 822060.

Declarations of interest

None.

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